CABLE-ANGLO SLOUGH
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ELECTRICAL REVIEW

FOUNDED 1872

Vol. CXXXIII. No. 3426 JULY 23, 1943 6d. WEEKLY

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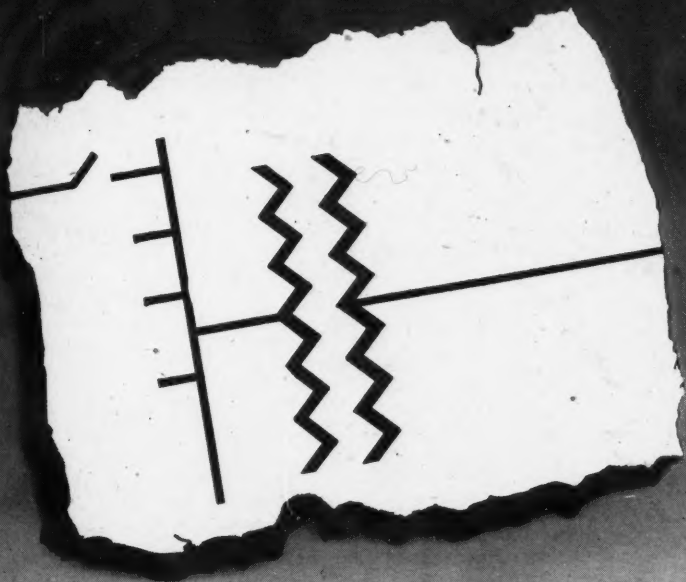

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July 23, 1943

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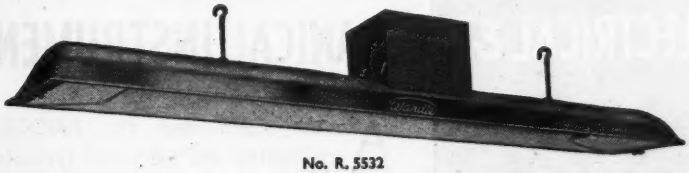

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ELECTRICAL REVIEW

THE OLDEST ELECTRICAL PAPER — ESTABLISHED 1872

Vol. CXXXIII. No. 3426. JULY 23, 1943 6d. WEEKLY

The Contracting Industry

Points from the E.C.A. Report

IT is probable that Mr. Walter Riggs, in his address last week as president of the Electrical Contractors' Association, was expressing a widely-held view when he hinted that "planning" was being overdone. His objection, it seems, was not to the principle, for he agreed that unpreparedness for peace was as bad as military unreadiness, but to the "inconsequential details."

He said that he was "amazed to think of all the committees and sub-committees discussing specifications and rules and regulations and the pros and cons of post-war practice generally." And yet some of these details are really "tremendous trifles." In many directions there has been a very definite break in details of practice which had been accepted as a matter of course, although there were suspicions that there was much room for improvement.

A New Start

Such a break gives an opportunity for an entirely fresh start, but unless something is done now the tendency will be to begin again where we left off. This aspect of the matter is stressed, so far as electrical installation work is concerned, by the prospect of the vast number of new buildings which must be erected as soon as conditions permit.

In spite of his general stricture, it is evident that Mr. Riggs concedes this much for he referred with some satisfaction to the part played by the E.C.A. upon "committees responsible for the preparation of war specifications and concerned with post-war planning in respect of the technical, economic and practical aspects of electrical installation work."

The Association also has its eye on the future of electrical trading. It is co-operating with manufacturers of appliances to examine "present methods of distribution and future possibilities."

Wage Demands

The industry, in common with most others, is faced with demands for extra wages to meet rising costs. The weekly war addition was designed for this purpose, but it is now considered insufficient by the men and a substantial advance in basic rates is being sought by the E.T.U. Mr. Riggs said that the contractors frequently received claims based solely on the contention that other trades were receiving higher rates. In the absence of a settled Government policy on this question such claims, even if not justifiable, are certainly understandable. It may be noted that the operation of the cost-of-living arrangement has been temporarily suspended.

Holidays with pay have now been introduced into the industry and it is satisfactory to learn that holidays will be insisted upon. The scheme is not to be used merely to provide an extra week's pay while a man continues to work.

Another subject dealt with during the year is the position of specialist sub-contractors, of which electrical installation engineers are a good example. Methods which are applicable to the building trade as such do not necessarily suit the sub-

sidiary trades and efforts are being made to get Government Departments and others to accord special and more appropriate treatment.

No mention was made by Mr. Riggs of the attitude of the E.C.A. towards the schemes which are being suggested for the reorganisation of the electricity supply industry, although it is a subject with which the electrical contracting industry is deeply concerned. The Association may be holding its fire until a more concrete target presents itself when no doubt they will seek to have the electrical contractors' position under any proposed "new order" clearly defined.

Cable Laying

EXCEPT in rare cases, distributors would not be run overhead if the economics of rural electrification permitted otherwise. Although in open country excavation of the ground does not form so large a proportion of the capital expenditure on a cable extension as it does in urban areas, it is nevertheless a major consideration. The cable plough has so far offered the greatest promise of improving on spade work and the development described by Mr. P. K. Davis in this issue, if not constituting a threat generally to the established practice of overhead construction for rural supply, does indicate that where cable work is considered necessary for special reasons it can be carried out at a relatively low cost.

Staff Appointments

EVER since the Undertakings (Restriction on Engagement) Order, 1941, was made electricity supply authorities (and the technical Press) have been uncertain which posts could be advertised and which could not. Very broad, hazy and non-committal rulings have been received from the Ministry of Labour and it is satisfactory to have something more definite from the Electricity Commissioners. As will be seen from the memorandum reproduced on another page, the term "manager" is more clearly interpreted although undertakings may not all agree with the definition. The securing of technical staffs is now, in the first place, taken out of the hands of the undertakings. They then have a limited choice of candidates but the last word is still with the Electricity Commissioners and the Ministry of Labour who will decide whether men can be released.

Technical Education

Two of the Government's educational proposals are of special interest to engineers. The first is the provision for obligatory day-continuation schools, in which approved institutions run by companies will have their niche. This provision may exercise a greater influence on the pupil's future than even the raising of the leaving age. The second proposal that a boy who intends to take up engineering should go to a technical school at eleven years of age will need care in its application. To give a vocational bias to general education is no doubt a good thing, so long as it does not lead to too early a specialisation in mental outlook. Every facility should be given to unsuitable students to be transferred to other kinds of secondary schools.

Electricity and Planning

AN article in this issue, as distinct from some others which we have published, endeavours to look at the question of electricity supply reorganisation from a wider point of view than that of the industry itself. The author thinks that increasing the benefit to the consumer or the raising of general efficiency may not be the principal motives. It is possible that electricity may be an influential factor in the reconstruction of our national economy. Therefore, while the industry may itself evolve an acceptable reorganisation scheme, it cannot do so without paying full regard to the general arrangements and co-operating with the national planning authorities.

Key Points

IN attacking the main switching stations in Northern Italy (which present more vulnerable targets than do the numerous hydro-electric stations feeding them) the R.A.F. went to the vital spot for the purpose of paralysing the enemy's trunk railways at a critical time. References in the daily Press to an Italian "grid" obscure the fundamental difference between this long-distance transmission system from the sources of supply to the load centres and the British grid. Since the latter was laid out primarily for the interconnection of generating stations (serving their own local loads) for mutual aid, electrified railways here do not incur the same risk of being put out of action as do the Italian railways.

Cable-Laying Plough

A Description of Some Recent Developments

By P. K. Davis, A.M.I.E.E.

AN instructive article by the late Sir Bernard E. Greenwell, then chairman of the County of London Electric Supply Co., appeared in the *Electrical Review* for May 29th, 1936, which described the design and use of a special type of plough for installing cables. It was shown that substantial savings in time and money could be effected by the use of this implement as compared with the usual hand-laying methods, and considerable experience was gained with it by the company. The following article describes more recent experience and developments, mainly the outcome of wartime conditions.

The Northmet Power Co. was recently faced with the problem of having to complete, without adequate resources of labour, an extensive and urgent cable-laying programme for providing important wartime supplies. Accordingly, a cable plough, as described in the above-mentioned article, was used for the smaller 11-kV cables and a stronger plough embodying certain modifications was evolved for installing 22-kV cables.

It was first required to lay 4½ miles of 0·1 sq. in. three-core 11-kV unarmoured cable over a cross-country route, this work being undertaken for the company by Clough, Smith & Co., Ltd., who had already laid considerable quantities of cable on aerodromes by this means after receiving preliminary instruction regarding the use of ploughs from the County Company. A drum length of 440 yd. was dealt with at a time, the cable being laid out on the ground surface and the plough used for cutting a slot 2½ in. wide and 2 ft. deep into which the cable was laid by lifting it from the ground surface and passing it by hand into the cable duct at the rear of the plough blade or coulter. The motive power for drawing the plough through the ground was provided by a power-driven windlass. The rate of ploughing was 15 yd. per min., and a maximum of 1,000 yd. of cable was installed by this method in one day under favourable conditions.

The installation of the whole of the 8,000 yd. of cable, including the crossing of hedges, ditches and roads by hand excavation, was completed by twenty men in three weeks, at an average of 500 yd. per working day. A similar job in connection with further urgent wartime supplies was then undertaken, involving the laying of about 5,000 yd. of 0·05 sq. in. three-core 11-kV cable to an aerodrome.

In view of the ease and speed with which these cables were installed, a new type of plough, as shown in fig. 1, was designed and built, embodying certain improvements on the original implement. These were the incorporation of a set of twin rollers in the cable duct, so that a 0·1 sq. in. three-core 11-kV cable and its accompanying pilot cable could be laid simultaneously, each of these cables passing down the duct on either side of the set of rollers. At the same time, the coulter was modified with a view to causing less disturbance of the ground than did the original shape, which tended to cut in an upward direction. The rear of the coulter was also extended by the fitting of two cheek

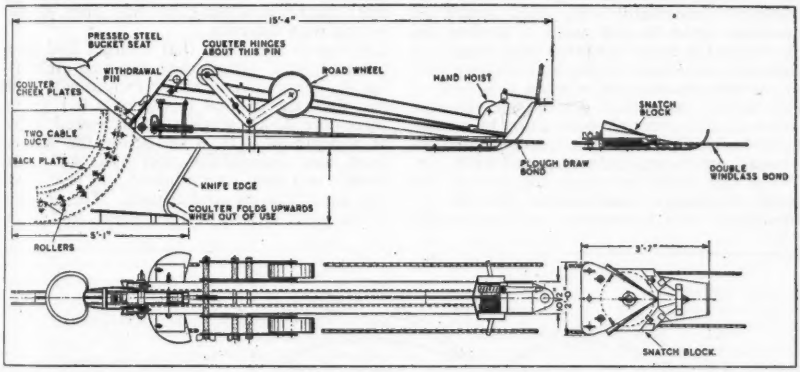


Fig. 1.—Cable-laying plough incorporating a number of improvements in the original design

plates in order to stabilise the whole implement.

As the result of these two modifications, it was found unnecessary to provide a bracket at the rear on which to place weights to keep the plough down in the ground, and an ordinary agricultural seat, upon which an operator could sit and assist in feeding the cable into the duct, was fitted in its place. A further improvement to facilitate the removal of the plough after use was the provision of two wheels on either side of the chassis, which could be brought into action by a small hand hoist after the coulter had been withdrawn from the ground and folded back.

The first route on which the plough was used was across a golf course between two important substations and a considerable saving in labour was effected by paying out the 11-kV cable from the drums which were mounted in turn on a trolley, towed behind a lorry a few yards in advance of the plough, while the lighter pilot cable was laid out on the ground surface as before. With this plough, it was found that the disturbance of the ground was so slight that the only reinstatement required was the closing of the slot by running a lorry along each side of it, after which the edges of the slot cut by the plough were "teased" with a fork and a heavy roller drawn over the route in one or two places where necessary. The reinstatement thus carried out was so successful that three weeks after the completion of the work the route of the cable was only located by eye with difficulty.

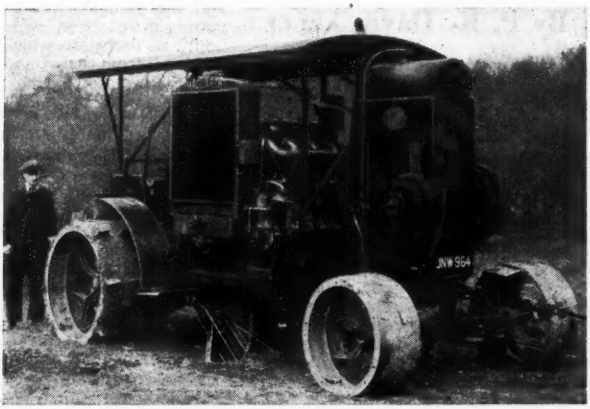


Fig. 2.—View of the implement shown in fig. 1

It was at this stage that a larger and more robust type of plough was designed embodying the improvements above mentioned. With this the experimental laying of a 0·1 sq. in. three-core 22-kV single-wire-armoured cable at a depth of 2 ft. 8 in. below the ground level was successfully accomplished. The chassis was then strengthened and reinforced and a much larger coulter used. The position of the latter relative to the chassis, and there-

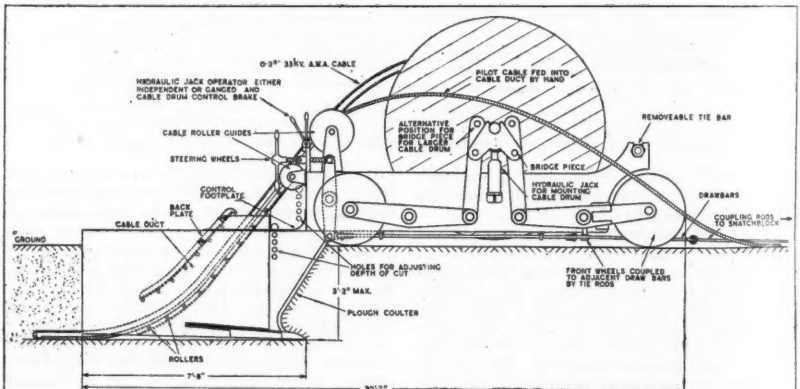


Fig. 3.—Plough for installing 0·2 sq. in. three-core 33-kV cable and pilot cable

fore to the ground level, was altered by inserting two pins in any pair of a number of holes drilled through it. In this way the depth of ploughing could be varied between 2 ft. 2 in. and 3 ft. 2 in. in 3 in. steps. In order to accommodate the larger cable, the coulter cheek plates were arranged 5½ in. apart and the cable duct was constructed to a larger radius and fitted with rollers. In addition, a superstructure carrying two cable rollers was fitted to the chassis to take the weight of the cable and to guide it towards the duct without bending it unduly.

Operations for installing the cable in the ground began with the digging of a hole 18 in. wide, 3 ft. long and just over 2 ft. deep, into which a small plough, similar to that shown in fig. 1, but fitted with a coulter without a cable duct or cheek plates, was inserted. This cut a "pilot" slot in advance of the large plough, so that the latter could more easily be drawn through the ground at a greater depth. The hole was then lengthened to 8 ft., its depth increased to 3 ft. and the coulter of the larger plough inserted and attached to the plough chassis. The cable drum was mounted on a trolley in front of the plough and both the plough and the cable trolley were connected to the snatch-block by means of steel bonds.

Removal of the back plate of the plough coulter followed and the cable was paid off the drum over the superstructure rollers and into the cable duct, so that it protruded beyond the end of the cheek plates, after which the back plate was refitted. The same mobile power-windlass was used as for previous jobs; the barrel of this was driven through reduction gearing by a 100-HP Diesel engine. Fig. 2 shows the self-operating ground anchor attached to the framework of the windlass.

The windlass was anchored 150 yd. in front of the plough and was used in this position for drawing both the pilot plough and the large cable-laying plough through the ground. For this purpose an additional snatch-block was fitted to the frame of the windlass to enable a triple steel rope to be used. This rope was taken from the windlass barrel *via* the plough snatch-block to the windlass snatch-block and back to the frame of the plough snatch-block to which it was fastened. This gave the necessary reduction in the speed of laying the larger cable and decreased the load on the windlass.

Ploughing operations were slower with the larger cable than in the case of the previous jobs, the speed of ploughing being reduced to 10 yd. per min., which allowed more attention to be given to the handling of the cable. The total length of cable installed in this case was 900 yd. This job was, however, of sufficient magnitude definitely to show that large cables up to 33 kV can be laid at an average rate of at least 150 yd. per day with a gang of only fifteen men. Such progress is considerably in excess of that which would be maintained by hand-laying methods using a much larger gang.

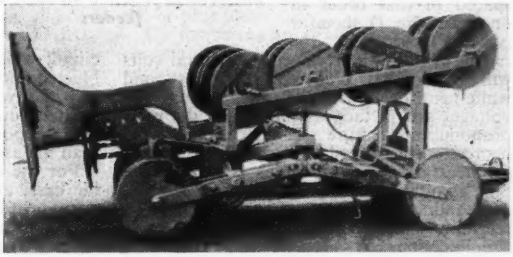


Fig. 4.—Arrangement for laying a large number of small cables in one slot

The satisfactory practical experience gained in connection with the works described here and elsewhere has resulted in the production of two further types of cable-laying plough which embody fundamental improvements in design. These improvements include the mounting of the chassis on wheels to reduce the tractive effort required, the incorporation of a steering device by altering the effective length of the draw-bars on either side of the chassis between the coulter and the snatch-block to negotiate curves, and the mounting of the cable drums on the plough chassis itself. Fig. 3 shows such a plough for installing a 0·2 sq. in. three-core 33-kV cable and pilot cable, while fig. 4 illustrates the specially-designed plough for installing a large number of small cables in one slot.

There is no doubt in my mind that the experience gained to date proves that where it is possible and desirable to install high-voltage cables along the shortest and most direct cross-country route, definite reductions of approximately 50 per cent., both in the installation costs and the time taken to carry out the work, are obtained by the use of a cable plough compared with any other methods.

American Coal Stocks

Mr. Harold L. Ickes, as Solid Fuels Co-ordinator, has advised essential war industries in the United States to accumulate from 90 to 120 days' supply of bituminous coal as rapidly as possible. It is estimated that the output of steam-electric plants in the United States this year will reach the figure of 136,000 million kWh, involving the consumption of an extra 10 million tons or more of coal.

Inherent Asymmetry

Unbalanced Voltage with Three Phases in Same Plane

By I.D.C.

The author explains an effect the existence of which is not generally known among engineers. It was observed in practice on some 400-V feeders

IF balanced three-phase currents R.W.B. of standard phase rotation are transmitted along three conductors, red, white, blue, equally spaced in that order in one plane (fig. 1), then for power factors in the region of unity the received red-neutral volts will be lowest, blue-neutral highest and white-neutral middle of the three. The voltages are, in fact, asymmetrical, the most pronounced feature being usually the depression of the red volts. The position of the neutral conductor, which is in this case only a voltage measuring conductor, is also relevant, but for simplification it is assumed to be substantially out of range of the field of the three conductors.

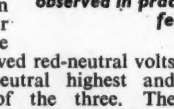


Fig. 1

It might be expected that the two outers, being symmetrically placed, would behave similarly, as they would in a single-phase three-wire system. As, however, the phase relations of each outer conductor to the middle and far conductors are different, the inductive E.M.F.'s are also different.

The reason for this asymmetry is as follows: Regard the red current (fig. 2) as resolved into a white (leading by 60 deg.) component flowing in the red-white circuit and a blue (lagging by 60 deg.) component in the red-blue circuit. The inductive back

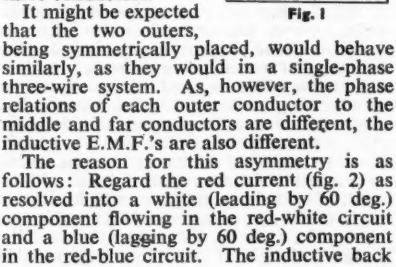


Fig. 2

E.M.F.'s due to these components lag 90 deg. behind the components. Hence the back E.M.F. due to the white component lags only $90 - 60 = 30$ deg. behind the red current and so (if power factor is about unity) tends to help the red volts. Similarly, that due to the blue component lags $90 + 60 = 150$ deg. behind the red current, and so tends to oppose the red volts. Now the white component flows in the red-white circuit which has the closer spacing and the blue component in the red-blue circuit which has the wider spacing and therefore the greater inductance. Consequently the opposing component of back E.M.F. is greater than the assisting component.

For the opposite conductor the reverse is the case, and for the middle one the components of E.M.F. are equal giving a resultant in quadrature with the current, *i.e.*, the usual inductive drop in a simple circuit. It follows that under the conditions described, red volts will be lowest, blue highest and white middle of the three.

This asymmetry is noticeable in co-planar busbars and in four-core medium-voltage cables where the three conductors are on three corners of a square. In 200 yd. of 0·2 sq. in. cable carrying 200 A at unity power factor the red volts would be about three per cent. lower than the blue, a difference easily observed on a voltmeter.

Statutory Industrial Commissions

THE Prime Minister of Southern Rhodesia, Sir Godfrey Huggins, when addressing the Salisbury Chamber of Commerce recently, said that after the war the country must embark on a policy of encouraging the immigration of Europeans of high grade type.

Discussing the development of secondary industries, the Prime Minister said that, realising the disabilities of both private and State enterprise, the Government had devised a system of "Statutory Industrial Commissions." So long as private enterprise functioned efficiently and developed the natural resources of the Colony and advanced the interests of the people the Government would do what it could to encourage it. But where the reverse happened the Government would not hesitate to take over the enterprise. The Government's policy could best be understood by the establishment of an Electricity Supply Commission, Roasting Plant Board (concerned with the treatment of refractory gold ores), Cold Storage Commission, Iron and Steel Commission, and Cotton Research and Industry Board. The Government was insistent that these commissions must be run on sound business lines and not be "creatures of political intrigue," which was likely to be the case if they were nationalised.

Illumination Measurements

Precautions with Photo-cells of the Rectifier Type

By G. Mogford, Grad.I.E.E.

THE modern photo-electric lightmeter has played an important part in the promotion of good lighting conditions for industrial premises. With its aid the lighting engineer can demonstrate in a convincing manner the need for improvement in an inadequately lighted factory. Also the works engineer can carry out periodical tests to determine when depreciation has lowered the efficiency of a lighting system to such an extent that maintenance is advisable.

For such purposes it is not necessary to take into account certain characteristics of the photo-cell which make it necessary to modify the instrument's readings in order to obtain a true indication of the illumination available. Where accurate measurements are desired a knowledge of the limitations of the instrument is required in order to obtain satisfactory results.

Apart from errors within manufacturing tolerances there are two major errors in commercial cells, *viz.*, those due to the different spectral composition of light sources, and those due to the non-compliance of the cell surface (and covering) with the cosine law.

The eye does not respond equally to the various colours of light, being most sensitive to the yellow green at 0·555 micron. The standard visibility curve of the C.I.E. (Commission Internationale de l'Eclairage) for photometric purposes, together with typical curves for copper-oxide and selenium cells, are shown in fig. 1. If a photo-cell is to give direct readings for illuminations provided by lamps having different spectral compositions, the response of the cell should follow this visibility curve. Unfortunately neither the copper-oxide nor selenium cells have response curves which approximate to the C.I.E. curve when in their natural state. They not only respond to radiations within the visible range but they are also affected by both infra-red and ultra-violet radiations. If they are standardised by means of a tungsten lamp operating at a colour temperature of 2,700 deg. K (a normal 230-V, 60-W general-service lamp) they will not give a true indication of the illumination available if the spectral composition of the source differs from that of the standardising source. For example, the selenium cell will have an error of from 40 to 50 per cent. when used to measure pure red or blue light.

The increasing use of sources having monochromatic or line spectra necessitates the application of some form of correction to the cell. At the moment the two basic methods in general use are the application of correction factors and the fitting of colour filters over the cell surface. The most popular is the correction-factor method. Factors are issued by manufacturers of photo-cells and it cannot be too strongly emphasised that those applicable to one make do not necessarily apply to another. The accompanying table of multiplying factors issued for two different types of cell shows the wide divergence attributable to their differing spectral response curves. For light sources having line or band spectra, *e.g.*, mercury-discharge lamps, factors cannot be determined to very precise limits. The use of shunts in the micro-ammeter circuit applies the correction factors electrically, but this method is used only on the larger and more expensive models.

Light source	*Selenium*	*Copper oxide*
Tungsten	1	1
Mercury-discharge	1·45	1·17
Sodium-discharge	1·35	1·43
Gas lamps (low-pressure) ..	1·1	1·08
Natural daylight	1	0·8
Fluorescent tubular lamp ..	1·05	0·95

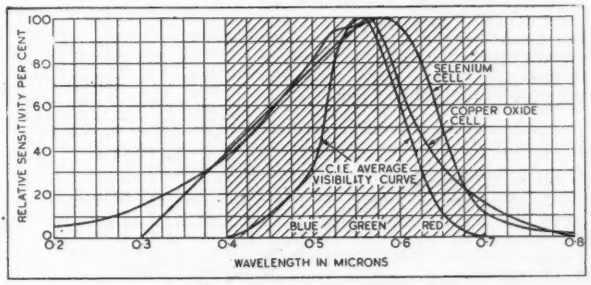


Fig. 1.—Spectral sensitivity curves of photo-cells

Correction factors should be applied with discretion as in certain installations a high

proportion of the light reaching the cell's surface does so after reflection from walls, machinery, etc., where the colour composition

Fig. 2.—Tests for cosine error

of the light is altered. For example, take the case of a small office the lighting of which is carried out by a single lighting unit; if the walls are finished with green paint or distemper and the ceiling with buff, a high proportion of the light reaching the working point from the lighting unit will have been modified in colour through the absorption of radiations other than green and yellow by the walls and ceiling. Now if a photo-cell is used for the illumination measurements the instrument's indications will be incorrect due to the difference between its response to these colours and the response of the primary light source.

In such a case the choice of a suitable correction factor requires a full knowledge of the characteristics of the cell in use. In practice, an estimation could be made, although this is liable to errors.

A further disadvantage of the correction-factor method is found in installations combining two types of light source of different colour composition, *e.g.*, mercury-discharge and tungsten. Here the choice of an accurate correction factor is extremely difficult. The best way is to measure the illumination provided by each type of source independently, apply correction factors and add the results. This method involves a good deal of work and may interfere with production.

Colour filters which modify the cell's response curve to a fairly close approximation to that of the visibility curve overcome the above objections, as the cell then provides a true indication irrespective of the colour composition of the source. Filters, normally of glass, can be manufactured which are chemically stable and which will retain their colour over long periods. Instruments equipped with filters can be calibrated to extremely close photometric limits, *e.g.*, ± 2 per cent. for tungsten lamps, ± 3·5 per cent.

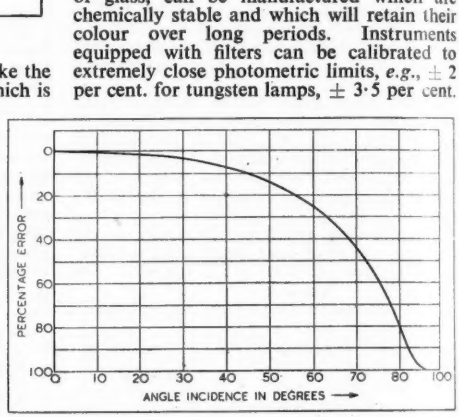


Fig. 4.—Percentage error (glass-covered selenium cell)

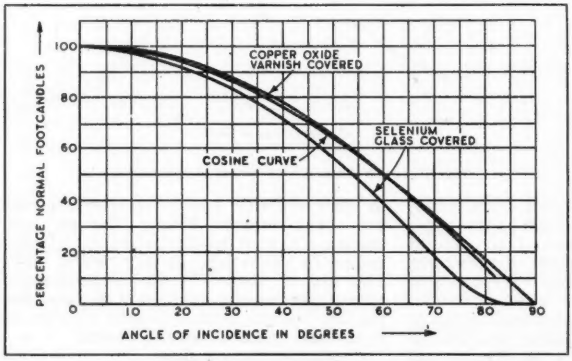


Fig. 3.—Effect of angle of incidence

for any continuous source and ± 5 per cent. for line spectra sources are normal. Lowered output of the cell owing to light absorption by the filters is one objection to their use, the other being that the cosine error is usually increased.

An important factor connected with all photo-cell work is the inability of the cell to respond equally to illuminations which are incident upon

it at any angle other than the normal and light incident normally. The cell in fact does not comply with the cosine law of illumination. For example, let a lamp "L" illuminate the surface of a cell from a distance sufficient to assume that the radiation is incident at practically the same angle for all points of the cell's surface. Record the cell's reading for light incident normally, then rotate the lamp through 90 deg., keeping it at the same distance from the photo-cell (fig. 2). Readings are taken at suitable angles and the results plotted with a base of angle of incidence and ordinates of illumination or percentage of normal illumination. If the cell had a perfectly diffusing surface the curve would follow a cosine function (*i.e.*, the recorded illumination values would vary as the cosine of the angle of incidence), but no commercial cell in its natural state has a curve

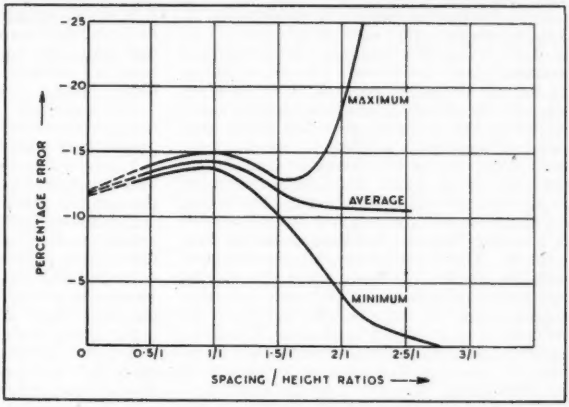


Fig. 6.—Error in measurement of standard lighting system

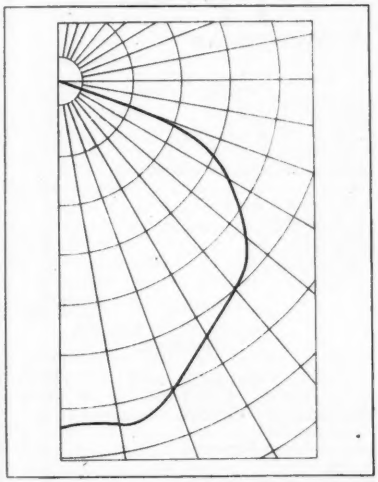


Fig. 5.—Candle-power distribution of standard industrial dispersive reflector

which does so exactly. This condition is aggravated in some cases by the use of a glass protective window over the cell.

Typical curves for two types of photo-cell are shown in fig. 3, one for a selenium cell with a glass window, the other for a copper-oxide cell treated with a special protective varnish. With the curve given by the copper-oxide cell the error due to non-compliance with the cosine law is small, but in the case of the glass-covered selenium cell the error is high enough to be taken into account in general illumination measurements. A curve giving percentage error against angle of incidence was used to facilitate total error calculations (fig. 4).

If the selenium cell is placed at the centre of a hemispherical source of luminous flux uniformly distributed, it would indicate about 74 per cent. of the true illumination value present. This is the extreme error and would not be met with in practice, the nearest approach being found in a well planned indirect installation. Since all surfaces normally used in industry exhibit similar characteristics to that of the cell's surface, this error is not of such a serious nature as might at first appear.

For example, the visual effort needed in reading a printed page depends upon the brightness contrast between paper and print. The brightness of most paper is affected only to a very small degree by the light reaching it at high angles of incidence and the lightmeter, therefore, tends to measure effective illumination rather than true illumination. Some industrial processes do not involve the same visual task and in some cases light reaching the work at angles of incidence of 65 deg. and upwards is of paramount importance. For a zone included within an angle of 60 deg. the error will be of the order of 15 per cent. and, as a similar condition is obtained with many lighting systems, errors of this magnitude must be expected.

Calculations have been made to determine

the error when measuring the illumination provided by a standard general lighting system. A square spacing of units was taken and calculations based upon the use of a standard industrial dispersive reflector (fig. 5). Spacing-height ratios were taken from 0·5 : 1 to 2·5 : 1 and the maximum, minimum and average errors calculated. As is to be expected the minimum error is obtained when the cell is directly under the lighting unit, whilst the maximum error occurs at the mid-point of four units. When the results were plotted (fig. 6) the average error exceeded 10 per cent. in all cases, reaching a maximum at a spacing-height ratio of 1 : 1. The falling off in the error at ratios below this is no doubt due to the type of distribution of the unit utilised. The error curves obtained for units with distribution differing from that of the one under consideration and also for other arrangements of units would no doubt be different, but it would appear fairly safe to assume that under normal conditions application of a correction factor of at least 1·12 could be made. The above figures relate only to one particular type of cell and must not be taken as general for all photo-electric photometers.

If measurements can be taken with the light reaching the cell normally and then corrected by the cosine law, the above error should not be taken into account, but due to the prevalence of closely spaced lighting units it is rarely possible to arrange for the light to be incident normally upon the cell for one unit only. In any case this is an extremely tedious method of measuring interior illumination.

To conclude: where fairly accurate measurements are to be made the following precautions must be taken:—

1. The calibration of the instrument should be correct or, alternatively, a curve showing divergencies from the true values used.

2. Suitable correction factors should be applied to the readings of the instrument for the various light sources.

3. Consideration should be given to the amount of light received from the walls, etc., and its colour composition, the correction factor being modified if necessary.

4. Some allowance for error should be made if it is known that the instrument used diverges radically from the cosine law.

5. If the lighting system is composed of discharge sources a suitable stabilising period should be allowed before taking measurements of the illumination.

Red Cross Appeal

Twelfth List of Subscriptions

THE organisers of the Electrical Industries Red Cross Appeal (2, Savoy Hill, W.C.2) have sent us a further list (the twelfth) of covenanted subscriptions and donations received from firms and individual members of the electrical industries. These raise the total subscribed so far to £16,516, a very acceptable sum, but one which still leaves ample room for improvement. It will be seen that the list is again representative of the several branches of the industry—manufacturing, supply, retail, contracting and radio.

We may repeat that all covenants and donations should be sent to the Electrical Industries Red Cross Fund, St. James's Palace, London, S.W.1. Information on any point can be obtained from the organisers at Savoy Hill.

Covenanted Subscriptions

	Gross Annual Amount £ s. d.
Brought forward ..	9,842 6 0
Morecambe & Heysham Elec. Dept.	200 0 0
British Industrial Plastics, Ltd. ..	100 0 0
Pinching & Walton	50 0 0
N.E. Electric & General Supplies	50 0 0
Mortimer, Gall & Co., Ltd. ..	20 0 0
James Crawford (Electrical), Ltd.	20 0 0
Carried forward	£10,282 6 0

	£ s. d.
Brought forward ..	10,282 6 0
MacWhirter, Ltd.	10 10 0
William White, Ltd.	10 10 0
G. E. Wallis & Sons, Ltd. ..	10 10 0
E. W. Jones, Ltd.	10 10 0
Midland Electric Installation Co., Ltd.	10 10 0
A. V. Milton & Co.	5 0 0
H. W. Teeton	5 0 0
Mikijohns, Ltd.	4 4 0
W. R. Stone, Ltd.	4 4 0
F. C. Barnard	2 0 0
	£10,355 4 0

Donations

	£ s. d.
Brought forward ..	6,117 16 0
Underwood (Electric), Ltd. ..	10 10 0
Westinghouse Electric International Co.	7 7 0
Enfield Radio Services	5 5 0
Sorbo, Ltd.	5 5 0
Buchan Cartwright & Co. ..	5 5 0
D. L. Chittenden, Ltd.	2 2 0
Geo. W. Bentley, Ltd.	2 2 0
E.M.F. (Electrical), Ltd.	2 2 0
F. J. Serle	1 10 6
H. Dakin & Co., Ltd.	1 1 0
Stenson & Co.	1 0 0
	£6,161 5 6

Engagement of Staff

Instructions to Electricity Supply Authorities

As the outcome of representations received by the Electricity Commissioners from various electricity undertakers concerning difficulties which had arisen in connection with the advertisement of vacancies for certain classes of staff, the Man Power Consultative Committee for the Electricity Supply Industry recently met one of the Joint Parliamentary Secretaries to the Ministry of Labour and National Service to discuss the operation of the Undertakings (Restriction on Engagement) Order, 1941 (S.R. & O. 1941 No. 2069).

Vacancies for managers, salesmen, domestic workers and non-specialised clerks are excluded from the scope of the Order, and may be advertised if necessary. The Ministry defines a " manager " as a salaried official in executive charge of a department, works or contract and points out that unless this definition applies, vacancies for higher grade professional and technical workers are covered by the Order. Normally the Ministry does *not* regard as managers deputy or assistant managers, or chief or other technical assistants, even though they may have some functions of control. A department is intended to mean a well defined department not a section or group of workers. On the other hand, a salaried superintendent or head foreman in charge of other foremen may be regarded as a manager. In cases of doubt the Ministry should be consulted.

The Ministry takes the view, however, that all other employees of electricity undertakings come (and in any case desires as a matter of policy that they should come) within the scope of the Order. The Ministry has, however, agreed as an administrative arrangement that undertakers may continue to advertise vacancies for positions in generating stations and substations other than for installation, maintenance and repair work.

Method of Procedure

With regard to the filling of vacancies which may occur for higher grade technical staff employed on transmission or distribution work, this question has been further discussed by the Commissioners with the Ministry and it has been decided that when the undertakers desire to make an appointment to their transmission or distribution staff or to fill a vacancy therein, they should in the first place furnish the Commission with (i) a statement indicating the necessity for the appointment and the reasons why it cannot be filled even temporarily from the present personnel of the undertaking by upgrading or otherwise; and (ii) the draft of an advertisement for the appointment containing all such particulars as the undertakers would regard as necessary. An upper age limit should *not* be specified. In no case must the undertakers themselves proceed to advertise the vacancy. If the Commissioners are satisfied, after any necessary consultation with the undertakers, that the appointment is one which should be filled from outside, they will notify the Ministry and forward the suggested advertisement.

The Ministry will then examine the records of the Appointments Department to see whether there are any suitable candidates immediately available; if so, the Ministry will send the necessary particulars direct to the undertakers for consideration, indicating the position in each case regarding arrangements for interview and release of the candidates. Unless there are good reasons to the contrary, undertakers would be expected to appoint, if only temporarily, the available candidates offered in this way so as to avoid the disturbance that might be caused by withdrawing more suitable candidates from other undertakings.

Advertising Vacancies

If there are no candidates available on the Central Register, or if such candidates as are notified to the undertakers are subsequently agreed by the Ministry in consultation with the Commissioners to be unsuitable even for temporary appointment, the Ministry will advertise the vacancy in the technical Press. All applications received by the Ministry will be forwarded to the undertakers for the selection of a short list of candidates considered suitable for interview. This list should be sent to the Ministry which will communicate with the employers of the candidates asking that they should be allowed to attend for interview, even if any question may subsequently arise as to whether the candidate, if offered the vacancy, could be released from his present employment. In order that this aspect of the matter may be considered at an early stage by the Commissioners, the undertakers should also send a copy of the short list to them.

The Ministry will advise the undertakers when the above-mentioned communications have been sent to the employers, and the undertakers should then arrange to interview the candidates. Without making an actual offer of appointment, the undertakers should notify the Ministry of their choices for the appointment in order of preference, and also send a copy of the list to the Commissioners. The Ministry, in consultation with the Commissioners, will then consider which of the

chosen candidates can, with due regard to wartime circumstances, be most appropriately released from his present employment; and where necessary the Commissioners will confer with the undertakers requiring the man and with the employers of the chosen candidates before finally advising the Ministry.

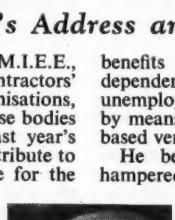
The Ministry will duly notify the undertakers of the candidate available, and when appointed to the vacancy, the officer will, where necessary, be granted indefinite deferment.

Contractors in 1942-43

E.C.A. President's Address and Annual Report

MR. WALTER RIGGS, M.B.E., M.I.E.E., president of the Electrical Contractors' Association and its allied organisations, addressed the annual meeting of those bodies on July 13th, and reviewed the past year's work. He commenced by paying a tribute to all those who had been responsible for the magnificent achievements of the United Nations since the Association's last meeting.

He went on to say that throughout its forty years' existence the Electrical Contractors' Association had fought for the reasoned square deal and it had no cause whatever to fear any judgment that might be passed on any aspect of its work.



Mr. Walter Riggs

Since their last annual general meeting they had heard much about post-war reconstruction and the part that industry was to play in that important work. Unpreparedness for peace was hardly less excusable than unpreparedness for war, but he wondered whether all was well. From a vast number of directions a wide variety of "reports" were being issued, whether specially called for or not. Was there not too much worrying about inconsequential trifles and far too little devotion to main and fundamental principles?

Continuance of Control

The necessity for Government control during the war was generally admitted, but how far was it going to be continued after the war? How long, for instance, would the Ministry of Works continue to usurp the functions of the business man and private enterprise? With the war yet to be won, Mr. Riggs expressed amazement at all the committees and sub-committees discussing specifications and rules and regulations and the pros and cons of post-war practice generally. They must, of course, play their part in these discussions, but he doubted whether the outcome would be more than expressions of pious opinions. In so many cases they seemed unlikely to achieve compulsory adoption.

Mr. Riggs referred particularly to the Beveridge Report and said that the social benefits which it envisaged were wholly dependent upon the elimination of mass unemployment. This could be achieved only by means of a highly developed export trade based very largely on private enterprise.

He believed that British industry, unhampered by political creeds and free from restrictive bureaucratic control, was capable of practically all the "planning" that was necessary. Such planning needed, and was entitled to, Government assistance, but this could best be given by a promise of reasonable security. Commercial stability was a national asset of the greatest importance.

Turning to the Association's activities, Mr. Riggs said that during the past year the E.C.A. had continued to play its part in the national effort. It had representatives on a variety of committees which had prepared war specifications and were concerned with post-war planning in respect of the technical, economic and practical aspects of electrical installation work.

During the year the Association had sought to lay the foundations of post-war trading principles and it welcomed the willingness of the manufacturers of certain current-consuming devices to join with it in examining present methods of distribution and future potentialities.

Sub-Contractors' Federation

The Federation of Associations of Specialists and Sub-contractors had been established as a live body to co-ordinate and enhance the interest of all specialised sections of the building industry. Active negotiations had taken place with various Government Departments to secure a greater degree of equity in respect of contract conditions. In the past members had been considerably embarrassed because the Government Departments negotiating with builders did not realise that conditions in respect of specialist trades required differential treatment.

In the course of the year an agreement had been reached between the Ministry of Works (representing all Government Departments)

and the Association regarding emergency repairs to bomb-damaged buildings. Efforts were being made to establish equitable conditions of payment for other classes of work.

The policy of the Government had been to leave the settlement of wages and working conditions to the voluntary machinery of the various industries, with provision for arbitration. But different problems, and very often the same problems, were being settled on entirely different bases. Consequently the electrical contracting industry frequently received claims based solely upon the contention that higher wages were being paid in other trades. Prolonged negotiations had been carried on with the Electrical Trades Union on a very large variety of matters. On the whole and despite a variation in the outlook and practice within the industry, as between district and district, there had been a large measure of goodwill and serious labour disputes had been avoided.

It was obvious that there was a complete differenee of outlook between those areas which were busily engaged in wartime building work and those in which there had been an almost complete cessation of installation work. It was the responsibility of the Association to co-ordinate these divergent views as far as possible and to negotiate with the E.T.U. in an endeavour to establish wages and working conditions on a fair and equitable basis.

Holidays with Pay

A noteworthy achievement had been the institution of a holidays-with-pay scheme which would give every operative the opportunity of a week's rest. Under no consideration would the scheme be allowed to provide the equivalent of two weeks' wages for one week's work. If an operative was unwilling or unable to take the holiday the holiday credit would not be paid to him. Apart from any legal aspect, it was right that the scheme should apply also in cases where holidays were already established practice in order that the matter should be on a standardised basis throughout the country.

A peacetime ideal of the Association had been attained by the statutory requirement that contractors must pay the wages and observe the conditions, neither less nor more, that were prescribed by the industry. This had the twofold effect of eliminating the contractor who undercut rates and of doing away with the competition of one contractor against another when labour was scarce. Amid the avalanche of Orders issued during the war this was one, and maybe there were others, that should receive consideration for permanent peacetime application.

Stressing once again the need, in the public interest, for the compulsory registration of electrical contractors and operatives, Mr. Riggs said that a compulsory wiring code was equally essential. The inter-industry committee on this matter, under the chairmanship of Mr. S. B. Donkin, had continued its deliberations. Meanwhile the National Register of Electrical Installation Contractors had continued to work within the limited sphere of its voluntary scheme. A valuable measure of control was thereby exercised over those contractors who secured registration, but it failed to touch the army of so-called wiring contractors, devoid of knowledge and experience, who did so much damage to the legitimate trade and exposed the public to such unnecessary risks of shock and fire.

Central Apprenticeship Council

In this connection it was interesting to note that a committee set up under the auspices of the Ministry of Works had reported on the provision of adequately trained entrants to the building industry in sufficient numbers to meet post-war requirements. Arising from that report the Minister of Works had set up a Central Apprenticeship Council, upon which the Association was represented, to deal with various aspects of apprenticeship.

Mr. Riggs said that it was too early for him to attempt to forecast the future. He had shown that in some directions immense possibilities arose ; the Association was alive to its responsibilities and was doing its best to play its part in all directions in which it could serve the national interest. He expressed his thanks to the vice-presidents, past-presidents, director and the staff of the Association.

In conclusion, Mr. Riggs, referring to his long period in office, said that while he was prepared to continue to serve to the best of his ability he would gladly be relieved of the burden ; he would welcome into office his successor, whoever he might be, and would be ready to assist him and the Association.

Power for Russian Industries

THE recent completion of tests on a large new turbine-generator at the Chelyabinsk central power station in the Urals is an example of the many measures now being taken to extend the supply of power for industry. This generator was assembled by the high-speed methods now common in the Soviet Union.

The work of expanding the power basis of industry in the Urals became especially important in connection with the evacuation of industrial enterprises from the war zone. In 1942 the capacity of electric power stations in the Urals was seven times as great as in 1940, the year before the war. In the east as a whole—the Urals, Siberia and Central Asia—the capacity of electric power stations in 1942 showed an increase of 28 per cent. over the preceding year. Within one year more than 100 large and medium sized turbines and about 100 boilers were installed at new and existing power stations. The number of new power installations which will be put into operation in the Soviet Union this year will be almost one-third greater than in 1942.—*Soviet Monitor.*

J.E.A. Scheme Opposed

AT its recent annual meeting, the Conference of Local Authorities Owning Electricity Undertakings in Greater London, which represents forty-one of the authorities in the London and Home Counties Electricity District, after a full discussion adopted by a substantial majority the following recommendations of its Executive Committee :—

(a) That the Conference expresses its strong opposition to the scheme proposed by the London and Home Counties Joint Electricity Authority for the reorganisation and development of electricity supply services for the London and Home Counties Electricity District and instructs its officers to take whatever steps are necessary to implement such opposition.

(b) That the Conference generally reaffirms and endorses the resolution passed by the Conference on July 6th, 1937, on the outline of proposals issued by the Ministry of Transport for securing the reorganisation of electricity distribution.

(c) That, pending the announcement of Government policy and proposals for the reorganisation of electricity distribution, the Conference should make representations to the Government that a competent authority, such as the Electricity Commissioners, should be given immediate compelling powers to deal with :— (1) Standardisation of system of supply and voltage, and (2) uniformity of methods of charge and form of tariff, including method of bulk supply charges.

Welding Plant Policy

TO clear up misunderstandings of its policy with regard to the issue of licences for welding machines, the Directorate of Industrial Electrical Equipment (Machine Tool Control, Ministry of Supply) has sent us the following memorandum. At the same time reference is made to misleading statements which have been published tending to show that DC welding is preferable to and cheaper than AC.

Purchase certificates are required for all DC welding machines and these are, in general, only granted when the work for which the sets are required cannot be carried out satisfactorily by AC; when other DC sets cannot be made available by transfer from work which can be carried out by AC plant, supplemented if necessary; when engine driven sets are essential for reasons of portability or the absence of electricity supply; or when only DC is available.

In other instances AC machines must be used, for several reasons. First, the productive capacity for DC motors and generators must be reserved for vital requirements which can only be met by DC machines. The use of AC machines shows a substantial saving in critical materials and components and in labour as compared with DC machines and the cost of AC installation is nearly always substantially less.

The operating costs of AC machines are lower than DC in view of the higher efficiency of transformers compared with motor-generators. Multi-operator DC sets compare even less favourably because of the additional loss in serious resistances. Maintenance costs and possibility of breakdown are also smaller with AC sets.

The standardisation achieved by the adoption of B.S.1071 has resulted in the provision of multi-operator AC sets which are suitable for modern requirements including high speed and deep penetration welding for shipbuilding and heavy constructional work. (The Senior Electrical Inspector of Factories, Ministry of Labour, who was represented on the B.S.I. Committee which drew up B.S. 1071 has approved the use of 100 V open circuit for electric arc welding purposes.)

The policy being followed by the D.I.E.E. in respect of applications for DC welding machines follows consultation and collaboration with the Machine Tool Control Arc Welding & Electrode Advisory Panel, the Admiralty and the Ministry of Supply Advisory Service on Welding.

In order to avoid unnecessary applications, proposals for DC machines should not be submitted without full information to satisfy the conditions set out in the second paragraph of these notes.

Space Heating

IN a paper read before the Institution of Heating and Ventilating Engineers recently Mr. A. C. Pallot, who is a member of the Fuel Efficiency Committee of the Ministry of Fuel, estimated that for space heating of all types 90 million tons of fuel was consumed per annum. Of this amount, about 7½ million tons of coke and 12½ million tons of coal were used for central heating and hot-water systems in domestic and commercial buildings and 40 million tons of coal for the space heating of industrial buildings. In addition, some 30 million tons of coal and 0·5 millions tons of coke were burned in open fire places and ranges.

In an average winter the mean and minimum day temperatures fell below 30 deg. F. on only four days and ten days respectively. About 10 million tons of coal might be saved by economic use, representing the output of 30,000 miners, in addition to labour in transport.

Fuel consumption increased by 3 per cent. for each deg. F. of increase of temperature in a building. Appropriate flow temperatures usually ranged from 105 to 180 deg. F. with corresponding external temperatures ranging between 55 and 30 deg.

In an ordinary office half the heat might be lost through normal air changes and an additional air change would increase the demand by 20 per cent. About 20 per cent. was also transmitted through glass. For hot-water service the temperature should not be more than 140 nor less than 110 deg. F. between which limits tests have shown fuel consumption to be least.

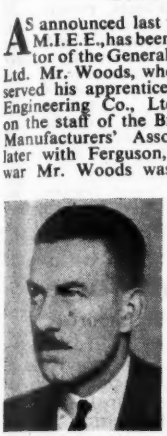
Supervisors' Discussion Group

IT is proposed to start a Supervisors' Discussion Group with headquarters at Enfield Technical College and the inaugural meeting will take place at the College on Thursday, July 29th, at 7.30 p.m. Mr. H. W. Broadbent, M.Sc.(Eng.), M.I.Mech.E., principal of the College, will take the chair and Mr. W. Puckey, general manager of Hoover, Ltd., will give an address. Although primarily intended for supervisors, membership is open to all persons interested in management problems.

PERSONAL and SOCIAL

News of Men and Women of the Industry

AS announced last week, **Mr. Reginald Woods,** M.I.E.E., has been appointed managing director of the General Cable Manufacturing Co., Ltd. Mr. Woods, who was educated at Harrow, served his apprenticeship with the Park Royal Engineering Co., Ltd., and subsequently was on the staff of the British Electrical and Allied Manufacturers' Association, being connected later with Ferguson, Pailin, Ltd. Before the war Mr. Woods was in business on his own account, which he left to join the Air Ministry in January, 1940, and later went to the Ministry of Aircraft Production.



Mr. Reginald Woods

During the time that he has been at the Ministry Mr. Woods has been in charge of production of electrical and hydraulic equipment for aircraft and responsible for rationalisation of aircraft type cable manufacture and distribution, expansion and dispersal of capacity for radio-frequency cable manufacture and for the special dielectrics essential for their manufacture. In addition, he has acted as M.A.P. Liaison Officer of the Cable Planning Organisation, a member of the Committee for the Standardisation of Cables and Wires for Government Services and on the Advisory Wire Panel of the Non-Ferrous Metal Control.

He has also been responsible for the output of the covered conductors industry for all Services and has carried out work necessary to ensure supplies of silk, rayon, enamel, cotton, glass, etc., covered wires. In this connection, and coupled with his work for the changeover from silk, and on behalf of the Silk and Rayon Controller, he has controlled the distribution of silk, rayon, nylon, etc., for electrical purposes. He is also chairman of the British Standards Institution Panel on low-loss standard conductors. Mr. Woods is taking over the managing directorship of the General Cable Manufacturing Co., Ltd., from **Mr. C. W. R. Pantlin,** chairman of the company who assumed the position on the death of the late Mr. John Wright in September, 1942.

The Sheffield City Council is advertising for a deputy manager for its transport undertaking. A salary of £1,000 is offered and applicants must not be more than forty years of age unless they have had previous local authority (pensionable) service.

Mr. L. H. Pearson, of Pearson Bros. (Nottingham) **Ltd.,** electrical and radio engineers, has been re-elected chairman of the Electrical Section of National Federation of Ironmongers.

Alderman W. Bradley (Bolton) has been elected president of the Municipal Passenger Transport Association for 1943-44, with **Mr. C. R. Tattam** (general manager, Bradford) as vice-president. **Mr. R. Stuart Pilcher,** C.B.E. (general manager, Manchester) has been re-elected hon. treasurer and new members of the Council are **Mr. A. A. Jackson** (general manager and engineer, Bolton) and **Mr. G. F. Craven** (general manager and engineer, Halifax).

Mr. D. J. W. Harvey, deputy electrical engineer at Kirkcaldy, has been appointed chief engineer and manager of the undertaking in succession to **Mr. G. F. Moore** who, as reported last week, has been recommended for the position of borough electrical engineer of Keighley. Mr. Harvey received his technical training at Heriot-Watt College, and for a number of years held various positions with the Edinburgh Corporation Electricity Department. In 1933 he was appointed substation superintendent at Sunderland and in 1939 he joined the Kirkcaldy undertaking as mains superintendent.

Mr. W. R. Elliott, A.M.I.E.E., who has served for 42 years at East Ham, is about to retire under the Council's superannuation scheme, and will be succeeded as electrical engineer and manager by **Mr. G. W. Ablitt,** A.M.I.E.E., who last year was promoted from assistant engineer to deputy engineer and manager.

Mr. Elliott, whose retirement takes effect as from September 5th, has accepted the position of secretary to the Council of the Electrical Research Association. A Londoner by birth, he had his early training under Professor Silvanus Thompson at Finsbury Technical College. His first position was that of an improver with the old National Telephone Co., and at the age of nineteen he was personal assistant to Marconi at the Bournemouth wireless telegraphy experimental station. During the Boer War, when he served as a naval lieutenant, he fitted the first wireless installations on warships at the Cape.

Mr. W. R. Elliott

Mr. G. W. Ablitt

Mr. Elliott joined the East Ham undertaking in 1901 as shift engineer and rose step by step to the position of deputy electrical engineer and tramways manager in 1923, being appointed engineer and manager the following year.

Mr. Elliott has been chairman of the South-East England Centre of the Incorporated Municipal Electrical Association and chairman of the London and Home Counties Area of the Electrical Development Association.

Mr. Ablitt, who is forty-four, was born at

East Ham. He served his apprenticeship with Crompton Parkinson, Ltd., and in 1923 was with J. Stone & Co., at Deptford. He was appointed shift charge engineer with the East Ham undertaking seventeen years ago.

Mr. W. B. Warhurst, LL.B., who takes up his duties as town clerk of Hammersmith in September, has been appointed hon. secretary of the Conference of Local Authorities Owning Electricity Undertakings in Greater London in succession to **Mr. Hugh Royle.**

Mr. J. J. Friend, meter reader with the Oldham Electricity Department, who on being appointed a magistrate was granted leave of absence without pay to attend to his magisterial duties, has made a further application for time off without loss of pay. The Electricity Committee has granted it on condition that he arranges with the engineer for any time off being made good.

Mr. C. R. Wilcox has been appointed turbine superintendent and maintenance engineer at the Southwick station of the Brighton Corporation Electricity Department. He has been for many years a turbine erector and service engineer with the Metropolitan-Vickers Electrical Co., Ltd.

Mr. F. C. Watson, boiler house control assistant at Fulham power station, has resigned to take up another appointment, and **Mr. T. E. R. Sanderson,** electrical tester at the power station, has tendered his resignation on medical grounds.

Mr. P. A. Leggett and **Mr. A. H. Leggett** have been appointed directors of Bull Motors (E. R. & F. Turner, Ltd.).

At the annual general meeting of the Manchester Branch of the Women's Engineering Society on July 12th **Mrs. L. C. Barton** (Barton Diecasting Service) was elected chairman and **Miss D. Smith,** A.M.I.E.E. (Metropolitan-Vickers Electrical Co., Ltd.), vice-chairman. **Miss J. E. M. Smith,** M.A. (Ferranti, Ltd.) is secretary. Members of the committee include Miss J. Dent (R. H. Dent, Ltd.), Miss M. Havelock, B.Sc. (Metro-Vick) and Miss G. Watkinson (Etchells, Congdon & Muir, Ltd.).

Obituary

Lady Kemnal.—The death occurred on July 16th, at Bournemouth, of Linda Larita, the widow of Sir James Kemnal. Sir James, who died in 1927, was managing director of Babcock & Wilcox, Ltd.

Mr. T. Ludgate.—We regret to record the death on July 8th at the age of fifty-nine of Mr. Thomas Ludgate, managing director of Bell Bros. & Co. (London), Ltd., and a past vice-chairman of the Electrical Contractors' Association, London branch.

Sir Alexander Mackenzie. — *The Times* announces the death of Sir Alexander Mackenzie, vice-president of the Brazilian Traction, Light & Power Co., which occurred at Kincardine, Ontario, Canada, on July 12th. Sir Alexander, who was eighty-three, studied law and was called to the Bar in 1883. He was closely associated with the Rio de Janeiro Tramway, Light & Power Co., and the São Paulo Tramway, Light & Power Co., from the inception of the enterprises, and for many years acted as general and legal representative of the companies in Brazil. When Dr. F. S. Pearson, president of the Brazilian Traction, Light & Power Co., and its allied companies, lost his life in the *Lusitania* Mr. Mackenzie was appointed to fill the vacancy. In 1919 he was created K.B.E.

Lt.-Col. W. M. Bridges.—We regret to report the death on July 14th, at the age of seventy-one, of Lt.-Col. Walter M. Bridges, principal of Walter Bridges & Co., consulting engineers, managing director of the Projectile & Engineering Co., Ltd., and a director of electricity supply companies. Col. Bridges commenced practice as a consultant in 1903. During the last war he served in the Royal Artillery and later held a commission in the R.E. Regular Army Reserve. He was a member of the Institutions of Civil, Electrical and Mechanical Engineers and of the Association of Consulting Engineers.

Mr. S. W. Bligh.—The death occurred on July 15th, at the age of fifty-four, of Mr. Sydney William Bligh, radio and electrical engineer, of Canterbury.

Correspondence

Spain's Electrical Imports

MAY I comment briefly on the statistics and notes furnished in your issue of June 25th, 1943, because the story is not quite complete. Although in 1941 Great Britain's share of Spanish electrical imports was only between £5,000 and £6,000 and in the first half of 1942 £9,890, I suggest as an incontrovertible fact that Great Britain's exports to Spain could have been much greater but for the economic and political situation which governs the whole question of Spanish trade.

For example, let us take electricity meters, which apparently are included under the import heading " Electric meters, voltmeters, ammeters and electro-medical apparatus," in which Germany retained the lead as the largest exporter and which showed the most notable increase of any item of Spanish imports. I have positive proof that Great Britain could easily have established the lead in the export of meters to Spain had the Government considered it expedient to grant export licences. One British firm alone was under contract to supply electricity meters to the value of £30,000, irrevocable credit being established in London, but perforce had to cancel the contract in view of the vital necessity of conserving the country's material resources.

I think nobody will attempt to argue that the Government's decision in this matter was not the right one, but on the other hand it may be of interest to many of your readers to know that in one particular section of the electrical industry at any rate, we had the opportunity substantially to improve our position in the matter of exports to Spain had we been in the position to take advantage of it.

Hollinwood, Lancs. G. REEVES,
Chairman,
Electricity Meter Manufacturers' Export Group.

National Planning

The Place of Electricity in the General Scheme

By "Student"

ELECTRICITY has always been considered as a vehicle of progress with social functions far surpassing its immediate usefulness. As early as 1900 the hope was expressed that electrical development would prevent the depopulation of London which was apparently feared in those days; the Reconstruction Committees during the last war expected electricity to play an important part in re-establishing the British export industry, increasing the productivity of labour and raising the general standard of living.

Similarly to-day electricity is called upon to serve as an instrument for social and economic reconstruction, as for instance in the proposals for rural development by the Scott Committee on Land Utilisation in Rural Areas. This is the reason why public interest has concentrated on its reorganisation much more than on any other public utility and why political considerations have always affected the solution of the problem.

Definition of "Service"

In a recent article (*Electrical Review*, April 4th, 1943, p. 545) the justification for interference with the electricity supply industry was stated to be the "certainty of improvement of the service to the community" and various reform proposals were examined as being different approaches to an identical goal. Actually "service to the community" is an extremely elastic term which leaves open the question of the function of electricity as a servant of society. Obviously a scheme which is perfectly adequate for achieving the standardisation of voltages may be utterly useless if the intention is, *e.g.*, to make electricity an instrument for influencing the location of industries.

It seems that a certain amount of fruitless controversy regarding electricity reorganisation has arisen, because no clear distinction was drawn between ends and means, between the social-political question of the role of electricity in society and the technical and organisational problem of how best to attain any given end. If the various reform proposals are examined with respect to the aims they implicitly pursue, they appear to fall broadly into three main groups.

The first comprises reforms mainly for the benefit of the users, such as the standardisation of voltages and the unification of methods of charge. These are now generally accepted as desirable and can probably be achieved on the evolutionary lines suggested by Sir Arnold Gridley (*Electrical Review*, July 2nd, p. 9).

Another and more ambitious group of proposals is concerned with raising the general level of efficiency of electricity distribution throughout the country. This is widely held to be only possible with the creation of larger units of supply combining developed and backward areas, joining rural districts to urban nuclei. Such a combination may not constitute an immediate advantage to all undertakings, indeed, some exceptionally favoured districts may have to make a temporary sacrifice in the common interest. Consequently, any hopes of purely voluntary reorganisation on these lines are likely to be disappointed and careful examination is necessary to ensure that the proposed larger supply bodies can be trusted to concentrate on the development of their whole areas. State control, as far as necessary, is directed to speedy, thorough and efficient development.

The third group of re-organisation proposals goes beyond the aim of high efficiency and general development of electricity supply and suggests the utilisation of electricity as an instrument of national planning. This idea has considerable appeal to those who reject complete State ownership and control and wish to retain individual freedom of movement and enterprise to a large extent, though guided and directed by comprehensive State planning. If autocratic instructions and prohibitions are to be avoided, persuasion has to be tried to ensure the compliance of the people with national requirements, coupled with material inducements.

Industry and Agriculture

Industries used to be tied to localities where raw materials and fuel were available. With the advent of electricity the dependence of many industries on coal has diminished and their decentralisation has become possible, on condition that cheap and efficient electricity is made available. Agricultural development may depend on the speedy electrification of the countryside irrespective of its immediate profitability, on the provision of electrical power on the farm, light and warmth in the farm-labourer's cottage and the entertainments which have become conventional necessities.

If electricity is enrolled in a planning policy of this nature, the principle of a general high level of efficiency will not meet the national requirements. There will be many situations, especially in the period of transition from war to peace, when the Government may decide on a system of priorities in construction and electrical development, when profitable extensions may have to be forgone in favour of what may appear to be speculative ventures

which will not repay their cost for many years. To this category of proposals belongs the innocent sounding suggestion for a complete unification of tariff rates throughout the country, which has recently been widely discussed after its recommendation by the Scott Committee. It is not relevant to the present argument whether generally the cost of rural distribution is necessarily higher than that of urban supply, but in any case generating costs are widely different between selected and non-selected stations, and distribution expenses vary from undertaking to undertaking. Compulsory unification of tariffs in all parts of the country would, therefore, necessitate extensive subsidies to high-cost undertakings, if the independence of supply authorities is retained, and this would in effect lead to the granting of a premium on inefficiency. Alternatively, the solution would be a complete pooling of expenses and revenues in a comprehensive national body.

Discriminating Tariffs

Theoretically, the idea of unification of tariffs does not go far enough, for it might be advantageous to reduce the charges in certain areas below the average and raise them in others from which emigration is desired. There are obvious dangers in such " juggling " with prices, as, of course, with any system of subsidies, for it makes it extremely difficult to retain reliable control over the efficiency of an undertaking. The relatively small importance of electricity in the cost of living and in the expenses of average industrial undertakings may not warrant the creation of complicated discriminating tariffs, but the example illustrates to what extent electricity might be used in the service of economic planning.

For this purpose electrical development policy must be guided by considerations external to the industry itself and can possibly only be justified by some overriding national interest. In wartime the Government can enforce compliance with its desires through its complete control over all activities, but in peace continuous interference by the State with a nominally independent industry would hamper efficiency and cause friction and obstructionism.

For this reason even a solution on the basis of autonomous regional public ownership, such as a Joint Electricity Authority, would probably prove unsatisfactory: if electricity is to be an instrument of national economic policy, control should be in the hands of a national authority unhampered by local or sectional interests or civil service routine. It should be responsible to the Minister or Board in charge of planning and industrial development, but would act through smaller, regional distribution boards to whom many functions, such as retail development, sales policy and publicity, could with advantage be delegated.

There appears to be no good reason for creating yet another supreme electricity authority, especially as the Electricity Commissioners are admirably equipped to undertake these new functions in view of their technical knowledge and administrative experience. Their function would be to interpret the general economic plan and formulate a suitable electrical development policy. They would then issue directions to the Central Electricity Board on the one hand and the regional distribution boards on the other.

Electricity is only one source of power and forms, therefore, part of the wider problem of the best use of national resources. The idea of an integrated fuel and power policy is by no means novel—suggestions on these lines were submitted to the Coal Commission in 1926—but it has become increasingly popular in recent reconstruction schemes. A national fuel policy would aim at the best utilisation of our limited coal resources for power, heat and by-products, and would therefore require a central authority not primarily interested in electricity, or gas, or coal mining. Its policy may frequently be in conflict with the immediate interests of any one of these industries; it can, therefore, only act successfully if it has the necessary powers over sectional interests.

Deciding the Industry's Future

By grouping the various electricity reorganisation schemes according to their aims, it becomes apparent that the future of the industry cannot be decided *in vacuo*, without regard to the general economic policy which will be adopted after the war and, consequently, cannot be determined by the industry alone. Most people will agree that a thorough reorganisation resulting in the creation of larger units is necessary, and there are indications that the pre-occupation with efficiency and rationalisation of the 1930's has given way to an appreciation of the complexity and interdependence of society and a desire for an active control of the economic life.

The principle of State control of electricity policy has been accepted ever since the creation of the Electricity Commissioners in 1919, but the degree to which central direction and administration will have to be extended depends in part at least on the likelihood or otherwise that the existing local undertakings will overcome their parochial jealousies. If municipalities and companies are not prepared to join in close and broadminded co-operation on regional boards, they have no right to complain if authorities entirely independent of them are created.

If the electricity supply industry desires to continue managing its own affairs, it will have to adapt itself to the new conditions and possible new functions of electricity and must give proof that it can create an organisation capable of achieving the ends which national policy will determine.

COMMERCE and INDUSTRY

Electricians' Wages. World Trade Organisation.

Post-war Employment

THE Minister of Labour and National Service has appointed a committee under the chairmanship of Lord Hankey, to consider and report upon the arrangements which should be made to facilitate the employment after the war of men and women qualified to undertake responsible work in the professions or elsewhere, with particular reference to (*a*) the organisation, premises and staff of the Appointments Department of the Ministry of Labour and National Service; and (*b*) the arrangements which should be made for co-operation between the Appointments Department and other organisations and institutions (including professional, industrial and commercial organisations) and Universities, at home and abroad. Professor R. V. Southwell, F.R.S., Rector of the Imperial College of Science and Technology, London, is a member of the Committee.

Wages in the Contracting Industry

It was reported here last week that the cost-of-living (war) addition to wages in the electrical contracting industry was to be reduced from 18s. 4d. to 17s. 11d. per week as from the second pay-day in July. The National Joint Industrial Council for the Electrical Contracting Industry now informs us that at the request of the Electrical Trades Union the National Federated Electrical Association has decided to suspend this declaration as and from the third pay-day in July (for the period covered by that pay-day) until further notice by the N.F.E.A. or the first pay-day in October, 1943, whichever is the earlier. Thus the weekly payment of 18s. 4d. will continue in force for the time being.

Contract Price Adjustment Formulæ

We are informed by the British Electrical and Allied Manufacturers' Association that the latest figures for use in its contract price adjustment formulæ are as follows:—(*a*) "Rates of Pay."—The rate of pay for adult male labour at July 10th shall be deemed to be 86s. 6d.; (*b*) "Costs of Material."—The index figure for intermediate products last published by the Board of Trade on July 10th is 171·4 and is the figure for the month of June, 1943. The figure for May was 170·9.

Hotplate Renewal in Australia

Restrictions on the manufacture of hotplates in England are stated to have interfered seriously with the supplies available in Australia. The *Electrical Engineer and Merchandiser* (Melbourne) adds that the position was made worse when some shipments failed to arrive in consequence of enemy action. Steps were taken to ease the situation by the manufacture of replacement hotplates in Australia. A difficulty, however, was the large number—nearly 40—different types and sizes of plates required for the many makes of ranges in use in the country. Engineers of the Sydney County Council tackled the problem and succeeded in reducing the number of sizes required to two and ratings to three (8 in. diameter, 1,750 W; and 6¼ in. diameter, 1,000 W and 600 W). To meet the variety of openings and methods of fixing a set of simple adaptors has been devised.

Electrical Ironmongers

At the recent annual meeting of the National Federation of Ironmongers, a report was presented from the Electrical Section. According to the *Ironmonger*, this made reference to the shortage of electrical supplies for civilian purposes and said that the Section's main task must be to maintain and strengthen its organisation in an endeavour to be ready to deal with the problems which would arise as soon as supplies became available again. They were already giving consideration to general matters relating to post-war organisa- and trading and they hoped to be able to co-operate effectively with other organisations which were interested in these matters.

After the war there would be a great demand for electrical goods and there were indications that attempts would be made to take the business out of the hands of private enterprise. The only possible antidote to that was much stronger organisation on the part of private enterprise traders.

Organising International Trade

Outlines of a proposed international organisation, the objects of which are described as "the regulation of the distribution of the main export products of all countries so as to ensure a satisfactory state of general employment, avoidance of want and poverty, and a steady uplifting of the standards of living," were announced this week by the World Trade Alliance Association, 14, Buckingham Street, Strand, London, W.C.2. It is proposed that the Governments of the United Nations should establish a World Trade Alliance Council which would create (*a*) a series of world export product committees; (*b*) a central world clearing bureau; (*c*) a central world development commission; and (*d*) a central world debt and money commission.

The product committee for each main export product would work out the terms and conditions of an international agreement for a quantitative distribution of exports and for maintaining reasonable economic export prices for a period of years. The committee would supervise the operation of the agreement, regulate export trade in the product and co-operate with the world development commission so that there might be a sufficient expansion of world consumption to ensure a complete quantitative distribution of the agreed export quotas. One of the most important functions of the central clearing bureau would be to endeavour to secure that every country balanced its imports and exports so far as possible.

The development commission would deal specially with projects of relief and development in distressed countries, and would promote

measures for raising the standard of living of millions of " backward " people and expand their purchasing capacity. The schemes of the commission would provide an " extra order book " of sufficient magnitude to enable the products committees to achieve a complete distribution of their exports so that no excessive stocks or surpluses would accumulate. Financial matters between countries outside the current accounting for the import/export exchange of products would be handled by the debt and money commission.

The president of the Association is Sir Edgar R. Jones and among those who have joined the council are Sir Felix Pole (Associated Electrical Industries), Mr. Leslie C. Gamage (G.E.C.), Mr. Cecil Bentham (chairman, British Engineers' Association), Mr. R. G. Henderson (International General Electric Co. of New York) and a number of trade union leaders.

Warehouse Fire Charge

At Birmingham Assizes last week Leslie Harold Jennings, aged seventeen, was sentenced to fifteen months' imprisonment for setting fire to a warehouse of Falk, Stadelmann & Co., Ltd., The Commissioner stated that Jennings, being dissatisfied with his wages, decided to burn down the premises in which he worked. He did it in circumstances of particular seriousness because at the time he was a fire-guard. It was due to other fire-guards that damage to the extent of about £100,000 was not done.

Gauge and Tool Makers

In order to allow more time for the nomination and election of members of Council for the new session the annual general meeting of the Gauge and Tool Makers' Association has been postponed to Wednesday, September 1st. Proceedings will commence at 2.30 p.m. and the meeting will be held at the offices of the Association, 2-5, Old Bond Street, London, W.1.

Industrial Recruitment and Training

A report of the conference held by the National Institute of Industrial Psychology and the Institute of Labour Management in March is now obtainable from the offices of the N.I.I.P., Aldwych House, Aldwych, London, W.C.2 (price 1s.). Present and post-war schemes of vocational guidance and recruitment for industry, problems of man-power, and training for and within industry are the subjects dealt with.

Trade with French Africa

Two Orders made by the Board of Trade under the Trading with the Enemy Act, 1939, remove restrictions upon trade between British nationals and French North and West Africa. This does not mean, however, that private trade can be resumed at present; all transactions must still be conducted through Government channels.

Fatality at Power Station

An inquest was held at Welshpool last week on Ian Macmillan McLarty, aged twenty-six, a Post Office engineer, who received a fatal electric shock at a power station. It was stated that he and another engineer entered an electrical cage to make certain experiments, and the coroner said that they did not take elementary precautions. They knew, he said, that they were entering what was almost a cage of death. Returning a verdict of " Accidental death," the coroner added that it was due to negligence.

A.S.E.E. Competition

The various branches of the A.S.E.E. throughout the country are now competing for a silver cup trophy. The competition, which is to commence with the June branch meetings in each year, is for the best all-round record, and the rules have been framed so as to bring out the technical and social aspects of branch life as well as general organisation. The trophy has been presented by Mr. A. W. Jervis, chairman of the N.W. London Branch, and in addition to a suitable inscription, bears the Association's emblem. The winning branches will retain the cup for a year, and a branch achieving the " hat-trick " will be presented with a miniature copy. The competition has been well received by the branches and is expected to influence local and national progress of the Association's development work in the interests of the electrical industry and its engineers.

TRADE MARK APPLICATIONS

THE following applications for trade marks have been received. Objections to any of the marks may be made within one month of July 14th:—

LAUNDROMAT. Class 7, No. 622,975. Domestic electric washing (laundering) machines.

SILVERSTAT. Class 9, No. B.622,976. Electric voltage and current regulators.—Westinghouse Electric & Manufacturing Co., East Pittsburgh, Pa., U.S.A. Address for service:—c/o G., Raymond Shepherd, 2, Norfolk Street, Strand, W.C.2.

FENEF. Class 11, No. 621,434. Apparatus and installations for lighting and heating aircraft; air cooling devices, radiators (not parts of machines), fans (not parts of internal combustion engines), etc.—F.N.F., Ltd., Llanthony Road, Gloucester.

SUFLEX. Class 17, No. 622,716. Electrical insulating sleeving.—Suflex, Ltd., Aintree Road, Perivale, Greenford, Middlesex.

INFORMATION DEPARTMENT

GENERAL inquiries from readers relating to sources of electrical goods, makers' addresses, etc., are replied to by our Information Department through the post. Inquiries should be accompanied by a stamped addressed envelope.

Our extensive records enable us to reply to most queries, but occasionally we ask for our readers' assistance in tracing names and addresses not known to us. We should be glad to have such information regarding the makers of the following:—

MERCROID mercury switches.

LINAGLOW accumulators.

BACHELIAR conduit fittings.

LAGEN MYOLIA bracket fitting combined lighting point switch and plug socket.

Argentine Foreign Trade

Figures for First Half of 1942

THE chief feature of the electrical import trade of the Argentine Republic during the first six months of last year was a sharp decline, compared with the first half of 1941, in lead-covered and armoured underground cables. The only noteworthy increase in the cable group was in the lead-covered description up to 5 mm. In the radio section of the import trade a decrease in complete sets was only partly offset by an increase in parts and accessories. In imports of motors and dynamos over ¼ HP there was a rise of about 30 per cent.

The accompanying table shows the values of the principal electrical imports, with a note of increases or decreases compared with the first six months of 1941. The values are those of the Argentine Customs department. This department has now changed its method of recording imports and henceforth will adopt invoice valuations. The values of individual items according to the new method have not yet been made available, but totals are given of the electrical apparatus group, which does not, however, include either cables or electrical machinery, these two groups being put into different classifications. The total value according to the Argentine Customs classification of the imports of this—very limited—electrical apparatus group during the first half of 1942 was 7,212,000 pesos, while the total real value is given as 16,280,000 pesos.

Description of Equipment.	Jan.-June, 1942 (Thousand Pesos)	Inc. or dec.
Motors and dynamos over ¼ HP and parts	908	+ 245
Fan motors	78	+ 55
Motors less than ¼ HP	46	— 5
Battery and accumulator parts	415	— 151
Automobile accumulators	1	— 4
Batteries	5	— 24
Jars for accumulators and batteries	22	— 25
Glass bulbs for lamps and valves	175	— 180
Radio-telephone apparatus	281	+ 243
Radio receiving sets	481	— 671
Amplifiers	75	— 2
Loudspeakers, metal	84	+ 45
Other radio telephone materials	1,183	+ 257
Telephones without coils	27	+ 6
Telephones with coils	129	+ 43
Magneto telephones	24	— 9
Other telephone apparatus and accessories	403	+ 250
Telegraph apparatus	48	+ 35
Switches, circuit-breakers, cut-outs, etc.	315	+ 113
Change-over switches for telephone installations, etc.	283	+ 39
Vacuum cleaners	113	+ 60
Cable and wire up to 5 mm. covered with cotton, rubber, etc.	241	— 93
Cable and wire over 5 mm. covered with cotton, rubber, etc.	23	— 194
Cable and wire up to 5 mm. covered with lead	156	+ 119
Cable and wire over 5 mm. covered with lead	1	— 544
Cable and wire covered with silk	47	+ 3
Enamelled wire	136	— 32
Other electrical cable and wire	13	— 7
Flex, covered with cotton, wool, etc.	137	+ 17
Flex, silk-covered	14	+ 10
Cables, underground, telephone or power, lead covered and armoured	159	— 2,009
Cables, iron or steel, covered with cotton, rubber, etc.	37	— 361
Accessories for underground cables	14	— 22
Electric bells	11	+ 2
Insulating tape	13	— 8
Lamps	431	+ 187
Torches	2	— 64
Irons	9	+ 8
Distribution boards	23	— 140
Insulating tubes	1	— 8
Meters	53	+ 30
Toasters, heaters, cookers, etc.	3	— 5
Other electrical goods	1,718	+ 611

Exports

The official statistics record a few electrical exports, of which the leading item is radio material. The trend in the period under review is shown below:—

Description of Equipment.	Jan.-June, 1942 (Thousand Pesos)	Inc. or dec.
Accumulators, batteries and parts	15	— 28
Radio telephone apparatus and parts	1,137	— 698
Other telephone apparatus and accessories	165	+ 131
Lamps	165	+ 55
Other electrical manufactures	472	+ 122

[The rate of exchange for the peso may be taken as 17 to the £.]

Post-War Technical Education

THE Government's White Paper on Education issued last week states that it is proposed that secondary education after the war shall be given in three types of school—grammar, modern and technical. These will not necessarily be separate establishments; they may be combined in one building or on one site.

An obligation will be placed on educational authorities to provide suitable facilities for technical, commercial and art education—full and part-time—and they will be asked to submit schemes for the approval of the Board of Education. The schemes will then be put into effect by such stages as the Board may determine.

It is recognised, however, that any scheme of technical or commercial education can only be thoroughly successful if there is close collaboration between educational authorities and industry and commerce. The Board and the Ministry of Labour and National Service have had consultations with various industries with a view to working out systems of training and apprenticeship appropriate to modern conditions. As a result it is hoped to institute a system for national application in each of the major industries.

ELECTRICITY SUPPLY

North Wales Water Power. Newcastle Reorganisation Plan.

Carlisle.—INCREASED CHARGES.—As it appears likely that the reserve funds of the Electricity Department will be entirely exhausted within the next two years the Electricity Committee has recommended the City Council to increase the charges, subject to the approval of the Electricity Commissioners and the Ministry of Fuel and Power. It is proposed that the new rates shall come into operation after the meter readings for the quarter ending in September. Examples of the revised charges are: Lighting flat rate, 4d. per kWh up to 5,000 kWh per quarter and 3½d. thereafter. Prepayment lighting, 4d. per kWh. M.d. lighting, fixed charge and 1½d. per kWh. Power and heating flat rate, 2d. per kWh up to 150 kWh per quarter and 1½d. per kWh thereafter. Domestic rate, fixed charge and ¾d. per kWh. For supplies outside the domestic area there is an addition of 15 per cent. to all charges.

East Ham.—WARTIME PRICE INCREASE LOWERED.—In January, 1940, electricity charges were increased by 20 per cent., and the discount for prompt settlement of accounts was reduced from 5 per cent. to 2½ per cent. Early this year the Council reverted to the 5 per cent. discount, and it has now been decided to reduce the wartime increase in the charges to 10 per cent. Councillor R. W. Dixon, chairman of the Electricity Committee, told the Council that it was possible to make this concession at the present time, and it was felt that the public should have the benefit of cheaper electricity.

Hazel Grove and Bramhall.—PROPOSED INQUIRY.—The Urban District Council has agreed to a request of the Hazel Grove and District Ratepayers' Association that the affairs of the electricity undertaking should be investigated by an impartial body. This followed a decision by the Council to increase the electricity charges by 20 per cent. At the same meeting Councillor R. Deen, chairman of the Electricity Committee, asked that a minute relating to the payment of accounts for bulk supplies should be taken back for reconsideration. He said that further information had been received which called for revision of the recommendation.

North Wales.—HYDRO-ELECTRIC INVESTIGATION.—Mr. J. Rankin, of the North Wales Power Co., reported at the quarterly meeting of the North Wales and South Cheshire Joint Electricity Authority, held at Llandudno, that his company had appointed two eminent engineers to investigate the possibilities of further hydro-electric development in North Wales. He stated that since the previous meeting of the Authority many farms had been connected to the supply. He added, "If the Government will contribute towards taking a line to farmers' homes, we are prepared to do our part."

Scotland.—AMENDMENT TO HYDRO-ELECTRIC BILL.—In the House of Lords last week during the Report stage of the Hydro-Electric Development (Scotland) Bill the Government accepted an amendment, moved by Lord Brocket, to provide that the Electricity Commissioners should not unreasonably withhold their consent to the erection of private generating plant if more than 50 kW.

TRANSPORT

Bournemouth.—EXTENSION OF TIME. — The Corporation Transport Committee has obtained an Order extending for three years the time for the commencement of the use of trolley vehicles on certain routes.

Manchester.—TRAM MAINTENANCE PROBLEM. —About 80 Corporation tramcars are laid up owing to the difficulty of procuring spare parts.

Middlesbrough.—DISUSED TRAM RAILS.—The Ministry of Supply has again been in touch with the Corporation Highways Committee regarding the use of the town's old tram rails as scrap. Some months ago the borough engineer (Mr. C. Gorman) estimated that to remove the rails, which are set in concrete, would cost well over £20,000 while their scrap value was only about £5,000. It was therefore decided not to proceed with the work. The Ministry of Supply has now suggested that instead of taking up all the rails, only the outer lines should be removed, as these, it was stated, would not be so costly to remove as the remaining lines. The borough engineer has estimated that the removal of these lines would cost £1,080 and after allowing for their scrap value there would be a loss of £728. The Committee has therefore decided to take no action.

Newcastle - on - Tyne. — REORGANISATION OF UNDERTAKING.—The City Transport and Electricity Committee has approved a plan for the reorganisation of the transport and electricity undertaking, which will permit the separation of the two sections if this is deemed necessary in the future. In a report on the subject the Committee states that reorganisation is essential as Mr. W. T. Dalton, chief engineer, retires shortly and several other senior officials will also soon reach retiring age.

Under the Committee's reorganisation plan the general manager, Mr. H. C. Godsmark, will be assisted by four senior officials—electrical engineer, rolling stock engineer, commercial assistant and traffic superintendent—each in charge of one sub-department.

Electricity in the city area is supplied by the Newcastle & District Electric Lighting Co., Ltd., and the North-Eastern Electric Supply Co., Ltd. The Council has the option to purchase the companies' undertakings in the city area but last year decided to do nothing in the matter during the war.

Sunderland. — TRAMWAY EXTENSION. —The Corporation's 1943 Bill which has received Royal Assent includes, among other things, a clause extending for a period of three years after the war the Corporation's powers to complete the tramways in Dykelands Road and Whitburn Road, Sunderland.

RECENT INTRODUCTIONS

Notes on New Electrical and Allied Products

Detachable Tee-Boxes

THE fused detachable tee-boxes devised by BRITISH INSULATED CABLES, LTD., Prescot, Lancs., to facilitate the economical positioning of power outlets in factories (*Electrical Review*, April 3rd, 1942) have been modified somewhat to permit the employment of a variety of outlet cables additional to the v.i.r. type in conduit originally intended.

Tee-box assembly with fuses, showing clamp fittings in split chamber

The conduit chamber, which is designed for erection at the same time as the main feeder conduit run, is now split along its centre line for convenience in less accessible situations. Other split forms for cutting-in on existing cable runs render the system more adaptable than hitherto. For instance, three clamp-type conductor fittings on an insulating base allow of the feeder cable being cut, opened out and rejoined in position; bare copper tubular connectors, a bakelite partition and conduit nipples are needed to complete the assembly. Again, clamps instead of nipples can be used to grip armoured three-core rubber-covered cable or lead-covered sandwich type paper-insulated three-core cable, while another variant will accommodate three single rubber-covered conductors for erection on cleats. Glands, clamps and nipples have common fixing centres to permit changes in cabling system subsequent to installation.

Soldering Irons

Since the introduction of a 9-in. lightweight soldering iron chiefly for the convenience of instrument makers (*Electrical Review*, May 14th, 1943, p. 663) two more additions to the "Pyrobit" range have been announced by the ACRU ELECTRIC TOOL MANUFACTURING CO., LTD., 123, Hyde Road, Ardwick, Manchester, 12. One of them, like the former, has a 45-W loading for generating 300 deg. C.; it is 13 in. long and weighs 6¼ oz. and is intended for radio equipment assembly work. The other is of 50 W and 295 deg. C., described as suitable for more universal use, being 12 in. long and weighing 7¼ oz. The steatite-clad elements are said to be quite airtight and spare bits of varied shapes are available to fit any of the three models.

Lamp Reflectors

New sizes of reflector fittings have been added to the range made by BENJAMIN ELECTRIC, LTD., Brantwood Works, Tottenham, London, N.17, thus completing type "X" for 80-W and 125-W discharge (vapour) lamps and for 80-W fluorescent (high pressure) tubes. Reflectors are now available in five principal patterns, namely, dispersive, glass-steel, parabolic angle, elliptical angle and vertical elliptical, besides which reflectors are made for 80-W and 125-W lamps in porcelain well-glasses and concentrating patterns. The standard form of construction embodies cast-iron flanges and porcelain lampholders in all sizes of "X" type reflectors.

Cable Stripper

Handy machines for removing the insulation from the ends of cable are produced by the VICTORY ELECTRIC CABLE STRIPPING CO., 57, Radcliffe Road, Hitchin, Herts. The cable is simply inserted in the vee notch beneath the blade, which is then pressed downward into the insulation so that an incision occurs when the cable is pulled out. The depth of cut is regulated by a set-screw at the side which is merely screwed up or down according to the size of cable, while a measuring rod fixed at the back of the machine adjusts the length of cut. The smaller models are easily operated by hand, but others are available which leave the operator's hands free for stripping tough rubber sheathing when a stronger pull is needed to withdraw the cable. The company also carries out experimental work for customers and has been recently trying out a machine for stripping armoured cable of large sizes which is expected to help to facilitate the salvage of rubber, lead and copper.

Insulation stripping machine

FINANCIAL SECTION

Company News. Stock Exchange Activities.

Reports and Dividends

The Electric Construction Co., Ltd., reports that after paying debenture interest £4,518 (same), general charges £63,670 (£62,913), war damage insurance £11,868 (£11,578), staff pension scheme contributions £8,308 (£5,271), trustees' fees £105 (same), auditors' fees £368 (£315), directors' remuneration £1,750 (£1,737), maintenance of plant and buildings £9,839 (£8,753) and depreciation allocation £15,000 (same), the net profit for the year ended March 31st last amounted to £118,201 (£97,967). Dividends on the 7 per cent. preference shares take £3,500, provision for taxation £55,000, provision for deferred repairs £25,000 and transfer to general reserve £15,000. After paying a dividend of 12½ per cent. (against 10 per cent.) on the ordinary shares (requiring £18,750) £33,641 is carried forward as against £32,690 brought in.

Thos. de la Rue & Co., Ltd., have issued a report for the fifteen months to March 27th last showing a net profit (before meeting taxation) of £342,914. Tax reservation is £165,000, leaving a balance of £177,914. Compared on an annual basis with the profit for the preceding twenty-one months the figures are £142,331 and £35,551. The dividend is 35 per cent. and £50,000 is put to general reserve (making £250,000). The balance carried forward is £68,158 (against £61,694). The directors state that they hope to repeat the 35 per cent. distribution for the current year.

The accounts are accompanied by statements by the chairman (Mr. S. S. Lambert) and the vice-chairman and managing director, Mr. B. C. Westall, who is also chairman of De la Rue Plastics, Ltd. Mr. Westall claims that the latter company is the largest in its field and is able to undertake work of the greatest variety and magnitude. He considers that manufacturing firms which put in their own moulding plants are making a mistake in view of the rapid changes which are taking place and the need for assiduous research.

Mirrlees, Bickerton & Day, Ltd., report a net profit for the year ended March 31st of £26,186, as compared with £18,784 for the previous twelve months. The ordinary dividend has been raised from 6 to 8 per cent. and £10,479 (£7,262) is carried forward.

Hick, Hargreaves & Co., Ltd., announce a net profit of £34,305 for 1942-43, after meeting taxation, against £31,816 for the preceding year. The ordinary dividend is maintained at 10 per cent. ; the allocation to contingency reserve is raised from £5,000 to £10,000 ; and £5,308 (against £7,403) is carried forward, subject to directors' fees.

Thomas Bolton & Sons, Ltd., in their report for the year ended March 31st show a trading profit (after providing for E.P.T.) of £299,043 as compared with £228,371 in the previous year. After deducting depreciation on fixed assets, £80,000 (£78,838), directors' remuneration, £3,375 (£2,479) and debenture interest, £17,820 (£18,000), there is a net profit of £197,848 (£129,054). Out of this £128,077 (£92,469) is transferred to reserve for income tax, £30,000 (nil) to general reserve and £20,000 (£10,000) to war contingencies reserve. In addition to repeating the final dividend of 5 per cent. on the ordinary shares, again making 7½ per cent. for the year, a cash bonus of 2½ per cent. (nil) is to be paid, leaving £65,428 (£78,157) to be carried forward.

British Vacuum Cleaner & Engineering Co., Ltd.—Addressing the annual meeting on July 19th, the chairman (Mr. H. C. Booth) said that the company was now making "Goblin" vacuum cleaners only for the Services. They had also successfully developed other lines, including time recorders and job costers which were marketed through their subsidiary, the Magneta Time Co., Ltd. That company's loud-speaker systems were being installed in an increasing number of factories. The B.V.C. company's industrial vacuum cleaner section had shown expansion.

Pye, Ltd., has declared a final dividend of 3 per cent. and a participating dividend of 2 per cent. on the participating preferred ordinary stock, making 10 per cent. for the year (same). The dividend on the deferred ordinary stock is again 25 per cent.

W. & T. Avery, Ltd.—The report for the year ended March 31st last shows a net profit, after meeting taxation, of £138,150 (against £130,407). The dividend on the ordinary stock is unchanged at 15 per cent.

George Kent, Ltd., is to pay a final dividend of 7 per cent. with a bonus of 2½ per cent. (same), again making 12½ per cent. for the year.

The Dubilier Condenser Co. (1925), Ltd., is again paying a dividend of 10 per cent. for the past year.

Hoover, Ltd., has declared an interim dividend of 3½ per cent. (same).

Lacrinoid Products, Ltd., is maintaining its interim dividend at 4 per cent.

The Delhi Electric Supply & Traction Co., Ltd., proposes to pay a final dividend of 5 per cent. tax free (same), again making 9 per cent. tax free for the year.

The Anglo-American Telegraph Co., Ltd., is paying a quarterly dividend of ¾ per cent. (same).

The Mexican Light & Power Co. reports a credit balance for 1942 after meeting bond interest, sinking fund, etc., of $523,736. There was a deficit of $672,998 for 1941. The debit balance is thereby reduced to $6,112,039.

The Mexico Tramways Co. incurred a loss of $235,477 on operations during the past year as compared with $410,081. The accumulated deficit up to December 31st last is $10,244,390.

The Brazilian Traction, Light & Power Co. announces that the gross revenue of the operating companies rose by $4,414,000 (American currency) to $46,570,000 for 1942 and their

charges by $1,589,000 to $31,391,500. The net revenue of the parent company, after providing $300,000 for amortisation, was $16,066,090 (against $13,148,684). Thus the earnings per share of the ordinary capital increased from $1·86¼ to $2·28¼ and the actual dividend paid was $1 per share. This year an interim dividend of 75c. per share has already been paid.

New Companies

John Fogg & Co., Ltd.—Private company. Registered July 2nd. Capital, £2,000. Objects: To carry on the business of manufacturers, importers, exporters and shippers of, agents for and wholesale and retail dealers in lamps, brackets, shades, glasses, stoves, ovens, wires, switches, batteries, motors and all things used in connection with illuminants, etc. Directors: J. Fogg, Ada G. Fogg and H. G. Fogg, all of Brown Edge House, Nutgrove, St. Helens. Registered office: 83, Liverpool Road, St. Helens, Lancs.

Berry's (Short Wave), Ltd.—Private company. Registered July 3rd. Capital, £100. Objects: To carry on the business of manufacturers and hirers of, and dealers in, radio and television sets, batteries, accessories, etc. Subscribers: J. M. Reeves, 76, New Cavendish Street, W.1.; and Derek L. Hickson, 32, Rosebery Vale, Ruislip, Middlesex. Secretary: J. M. Reeves.

Bothwell Electric Supplies (Glasgow), Ltd.—Private company. Registered in Edinburgh, July 5th. Capital, £300. Objects: To acquire the business of an electrical engineer carried on by J. B. Epstein as the Bothwell Electric Co., at 54, Eglinton Street, Glasgow. J. B. Epstein, 44, Midlothian Drive, Glasgow, is the first director. Registered office: 58, West Regent Street, Glasgow.

Hill & Ennis, Ltd.—Private company. Registered in Dublin, July 6th. Capital, £500. Objects: To carry on the business of manufacturers of, and dealers in, wireless, telegraph, telephone and television apparatus, etc. Subscribers: T. Hill and F. Ennis, both of 65, Thomas Street, Dublin.

Chas. R. Eames, Ltd.—Private company. Registered July 8th. Capital, £4,000. Objects: To acquire the business of an electrical engineer carried on by C. R. Eames at 2, Trinity Street, Wrexham. Directors: C. R. Eames and Dorothy M. Eames, both of 124, Borras Road, Wrexham. Registered office: 2, Trinity Street, Wrexham, Denbigh.

Exeter Ignition Co., Ltd.—Private company. Registered July 1st. Capital, £5,000. Objects: To acquire the business carried on by K. R. J. E. Jacobs as the Exeter Ignition Co., and to carry on the business of electricians, electrical and mechanical engineers, etc. Directors: K. R. J. E. Jacobs, Lake Barton, Newton St. Cyres, and Amy M. E. Jacobs, "Luccotts," Norton, Stoke-under-Ham, Somerset. Registered office: Summerland Street, Exeter.

Electro-Mechanical Manufacturing Co., Ltd.—Private company. Registered June 28th. Capital, £2,000. Objects: To carry on the business of electrical, mechanical and radio engineers, scientific instruments makers, etc. Directors: W. H. Turner, The Grove, Meanwood, Leeds, and T. A. Holroyd, The Cottage, North Grange Road, Headingley, Leeds. Solicitors: F. W. Bell & Son, Permanent House, Leeds.

F. A. Goode, Ltd.—Private company. Registered June 22nd. Capital, £1,000. Objects: To acquire the business of a radio dealer carried on by F. A. Goode, at 114, Euston Road and 5, Towcester Road, both in Northampton, and to carry on the business of manufacturers and repairers of, and dealers in, electrical and mechanical apparatus and accessories, radio sets and valves, gramophones, etc. Directors: F. A. J. Goode and Mrs. A. S. C. Goode, both of 114, Euston Road, Northampton. Registered office: 5, Towcester Road, Northampton.

Milne & Longbottom, Ltd.—Private company. Registered July 13th. Capital, £7,500. Objects: To acquire the business of a manufacturing electrical engineer carried on by R. Milne at Rochdale as Milne & Longbottom. Directors: R. Milne and R. E. Milne, both of 35, New Barn Lane, Rochdale. Registered office: Elm Works, Mere Lane, Rochdale.

Lincoln Electric Welding Works (Nottingham), Ltd.—Private company. Registered July 14th. Capital, £2,000. Objects: To carry on the business of electric welding, electrical, mechanical and general engineers, founders, metal workers, motor manufacturers, etc. Directors: M. Howard, 15, Station Street, Nottingham, and C. A. Walker, Dalkeith Terrace, Nottingham.

Companies' Returns

Statements of Capital

Wireohms, Ltd.—Capital, £6,400 in 4,000 preference and 2,400 ordinary shares of £1. Return dated January 5th. 2,055 preference and 2,395 ordinary shares taken up. £4,450 paid. Mortgages and charges: Nil.

Donovan Electrical Co., Ltd.—Capital, £50,000 in £1 shares. Return dated December 22nd. 29,100 shares taken up. £29,100 considered as paid. Mortgages and charges: Nil.

M.S.L., Ltd.—Capital, £500 in £1 shares. Return dated May 14th. All shares taken up. £500 paid. Mortgages and charges: Nil.

Magnetic Separators, Ltd.—Capital, £500 in 500 shares of £1 each. Return dated May 31st, 1942 (filed March 19th, 1943). All shares taken up. £500 paid. Mortgages and charges: Nil.

Elkay Electrical Manufacturing Co., Ltd.—Capital, £1,000 in £1 shares. Return dated June 30th, 1942 (filed March 27th, 1943). All shares taken up. £1,000 paid. Mortgages and charges: Nil.

Electric Service Co. (Grimsby), Ltd.—Capital, £1,000 in £1 shares. Return dated April 15th. 1,000 shares taken up. £1,000 paid. Mortgages and charges: Nil.

H. A. Lamb & Sons, Ltd.—Capital, £1,000 in £1 shares. Return dated December 31st (filed May 14th). All shares taken up. £615 paid. £385 considered as paid. Mortgages and charges: Nil.

Frances Electric, Ltd.—Capital, £2,000 in £1 shares. Return dated June 20th, 1942

(filed April 12, 1943). 402 shares taken up. £402 paid. Mortgages and charges: Nil.

Spensers (London), Ltd.—Capital, £12,000 in £1 shares. Return dated February 26th. 10,553 shares taken up. £2,553 paid. £8,000 considered as paid. Mortgages and charges: Nil.

Mortgages and Charges

Brush Electrical Engineering Co., Ltd.—Satisfaction in full on July 1st, 1943, of two deeds, each securing £125,000 debenture stock, dated November 1st, 1899, and March 14th, 1892, and registered pursuant to Section 12 of the Companies Act, 1907, on September 30th, 1908.

Internal Telephone Services, Ltd.—Satisfaction in full on July 3rd, 1943, of mortgage and debenture, dated March 5th, 1940, and registered March 18th, 1940, securing all moneys due or to become due from the company to District Bank, Ltd.

Britannic Electric Cable & Construction Co., Ltd.—Further debenture, charged on the company's undertaking and property, present and future, including uncalled capital, dated July 5th, to secure £25,000 (supplemental to debentures dated June 28th, 1938, October 11th, 1939, May 15th, 1940, October 20th, 1941 and November 26th, 1942). Holders: Westminster Bank, Ltd.

Aabacas Engineering Co., Ltd.—Assignment on June 28th, of proceeds of contracts, to secure all moneys due or to become due from the company to Barclays Bank, Ltd.

Eaton Electrical Co. (Woolwich), Ltd.—Satisfaction in full on April 3rd, of debenture dated September 22nd, 1939, and registered October 3rd, 1939, securing £150.

Dowsing Co. (Electrical Manufacturers), Ltd.—Assignment on July 2nd, 1943, of proceeds of contracts, to secure all moneys due or to become due from the company to Barclays Bank, Ltd.

Bankruptcies

H. J. Fowlie, electrical engineer, 40, Queen Street, Maidenhead. Supplemental dividend of 3¼d. in the £, payable July 30th, at 8, Forbury, Reading.

G.E.C. Report

IN its report for the year ended March 31st, the General Electric Co., Ltd., shows a profit on trading and income from investments of £1,748,917, as compared with £1,725,137 for the preceding year after providing for E.P.T. and contingencies. These figures take account of profits of subsidiary companies to the extent of the dividends declared and make full provision for any losses incurred.

From the profit are deducted depreciation £459,619, directors' fees £4,281, and contribution to pension fund £89,276, leaving a net profit of £1,195,741 (against £1,180,946) to which is added £815,379 brought in, making £2,011,120 available. It is proposed to place £700,000 to income tax reserve and to pay an ordinary dividend for the year of 10 per cent. plus a bonus of 7½ per cent., both less tax, maintaining the distribution for the year at 17½ per cent. The balance carried forward is £817,762.

The annual meeting of the company will be held on July 29th and in a statement issued with the report and accounts Dr. A. H. Railing refers to the grievous loss which the company sustained through the deaths of Lord Hirst and Mr. Chris. Wilson.

Dr. Railing reiterates the regret expressed in previous years by Lord Hirst that war taxation does not allow the company to add still further to its reserves during this period. He says that for years the directors have followed the policy of writing off items of expenditure and depreciation which, not being allowed for taxation purposes, had to be borne entirely out of the available net profit. These sums during the years of increased activity are of necessity larger, and if their usual principles of prudence are applied they can be met either out of the sums which might otherwise be added to reserves or out of the amount available for dividends. Apart from the large carry-forward the general reserve stands at £4,700,000.

The company is at present engaged entirely on work essential for the prosecution of the war. It has done its utmost to respond to the many calls made upon it both to increase production in its own field and to meet the many new demands which have arisen for the country's fighting services and for those of the allies. This work, constantly expanding, has largely increased the output during the year and still further increased the order book.

The company strongly feels that all its energy and all its resources at this juncture must be concentrated on the task of winning the war. It is mindful, of course, of the problems which will confront it after the war and of the important part which it must be prepared to play in the post-war world. Some of the conditions which will then prevail cannot yet be clearly foreseen as, for instance, the degree of international co-operation for the marketing and exchange of goods, the relative importance of replacing capital goods or providing consumers' goods immediately after the war, the spending power available for various countries and the measure of expansion allowed to various industries. It is self-evident that some clarification on these points will have to take place before definite decisions can be made. Given a degree of security to plan for a period of years, there are unlimited possibilities in the industry to expand and provide employment, both in existing and new fields of application.

The company has always realised the fundamental importance of research for industry and the vigorous research policy which it has followed for many years has been fully justified in peace and war. It is more than ever determined to continue it and to expand it further, and a long-term policy is the first essential for these plans.

The company's pension scheme has been in operation for twenty-three years and its funds now stand at £2,900,000. The War Savings of employees are now at the rate of £5,000,000 a year. Of the company's employees 4,600 men and women have joined the forces; 119 of them have lost their lives, 91 are prisoners of war and 25 are missing. Twenty have been decorated and another nine mentioned in despatches.

STOCKS AND SHARES

TUESDAY EVENING.

PAUSING before starting to consider, in this issue of the *Electrical Review*, representative instances of the price-changes that have occurred since the year began, some investors may ask what use such comparisons afford.

The answer is simply an appeal to experience. Any member of the Stock Exchange will testify to the practical interest his friends take in the fluctuations which have occurred over a period that commences with the beginning of the calendar year. Those fluctuations are studied in relation to the current financial conditions of the day. They affect the judgment, and the decision, of the prospective buyer or seller.

Electricity Supply

Preference and ordinary shares in the group of Home electricity supply companies were a good market up to the time when the London & Home Counties J.E.A. put forward proposals for substituting a single authority in place of the various existing individual undertakings. The holders of shares in the London electricity supply group became a little nervous. Some people sold their shares: others, who had previously been consistent buyers, cancelled their limits. The prices gave way: not, however, to any great extent. The net result is trivial—a striking tribute, it may be repeated, to the faith of the investor in the stability of the electricity supply industry, shocks or no shocks.

How London issues have fared, this table illustrates:—

Ordinary shares	*Dec.* 31, 1942	*Now*	*Fall*
	s. d.	s. d.	s. d.
City of London .	31 6	29 6	2 0
County of London	39 0	39 0	—
LondonAssoc.Elec.	22 6	22 0	6
Metropolitan .	40 6	40 0	6
Northmet Power .	38 0	36 6	1 6
South London .	26 0	26 0	—

The ordinary shares in the Scottish and provincial electricity supply companies have held most of the ground they gained during 1942. The market is affected mainly by the tendency of gilt-edged stocks. These are now a little lower than at the beginning of the year.

Ordinary shares	*Dec.* 31, 1942	*Now*	*Rise or Fall*
	s. d.	s. d.	s. d.
Bournemouth & Poole	57 6	56 6	— 1 0
Clyde Valley . .	40 6	39 0	— 1 6
Elec. Dis. Yorks. .	43 6	44 6	+ 1 0
Lancs. Light & Power	35 6	34 6	— 1 0
Midland Counties .	40 0	38 6	— 1 6
Midland Elec. Power	43 6	42 6	— 1 0
North Eastern .	32 6	32 0	— 6
Northampton . .	47 6	47 6	—
Scottish Power . .	40 0	37 6	— 2 6
Yorkshire Elec. .	41 0	39 6	— 1 6

The feature in overseas electricity shares has been the rise in Calcutta ordinary, on hopes that the company will be taken over at a high price next year by the Calcutta Corporation. The advance in Whitehall Electric preference reflects the satisfaction felt with the recent reorganisation of the company's capital. Some of the changes are as follows:

Ordinary shares	*Dec.* 31, 1942	*Now*	*Rise or Fall*
	s. d.	s. d.	s. d.
Calcutta . .	31 6	38 0	+ 6 6
Palestine . .	31 6	43 6	+12 0
Victoria Falls . .	78 9	82 6	+ 3 9
Whitehall pref. .	20 0	25 0	+ 5 0
Tokyo 6 p.c. . .	21½	20	— 1½

Communication Stocks

The market for communication stocks has been enlivened by spasmodic animation in Cable & Wireless issues. After sharp variations, the ordinary shows surprisingly little net change for such a volatile stock. The preference, however, has improved by several points. Another feature in this group has been a substantial advance in American "Tel. & Tel." This was due to Transatlantic demand, Wall Street speculation in American industrials having been fairly active during this year. Severe restrictions upon British dealings in all save a very few dollar stocks are still in force. Brazilian Tractions are amongst those few, and the price, though well below its recent best, shows a substantial advance upon the 22¼ level at which it stood last January.

Representative examples of the market's fluctuations are:—

Stock or Share	*Dec.* 31, 1942	*Now*	*Rise*
Anglo-American pref.	109½	114½	5
Cable & Wireless pref.	107½	114½	7
Cable & Wireless ord.	75½	78	2½
Great Northern .	23	24	1
International Tel. & Tel. . . .	7	17	10
Marconi Marine .	31s. 6d.	32s. 6d.	1s.

Industrial Ordinary Shares

The wartime popularity of gilt-edged stocks has waned to some extent. Business in them has noticeably declined. "Wings for Victory" weeks competed with success for capital and for public attention. As the war news grew cumulatively better, people looked more and more for shares in companies with good post-war prospects. This tendency embraced ordinary shares in practically all the good industrial concerns. Consideration of immediate income is now, many investors frankly declare, of less consequence to them than is the hope of securing improvement in prices after the war. The day is long past for the buyer of industrials to insist upon 7 per cent. as the minimum acceptable yield from ordinary shares. It is probably instructive—

(*Continued on page* 125)

ELECTRICAL INVESTMENTS

Prices, Dividends and Yields

Company	Dividend Previous	Dividend Last	Middle Price July 20	Rise or Fall	Yield p.c. £ s. d.
Home Electricity Companies					
Bournemouth and Poole	12½	12½	56/6	..	4 6 10
British Power and Light	6	7	31/–	..	4 10 4
City of London	7	7	29/6	..	4 15 0
Clyde Valley	8	8	39/–	..	4 2 0
County of London	8	8	39/–	..	4 2 0
Edmundson's: 7% Pref.	7	7	34/–	..	4 2 4
Ord.	6	6	28/6	..	4 4 3
Elec.Dis.Yorkshire	9	9	44/6	..	4 1 0
Elec. Fin. and Securities	12½	12½	52/–	..	4 16 1
Elec. Supply Corporation	10	10	46/–	..	4 7 0
Isle of Thanet	2	Nil	17/–	..	—
Lancs. Light and Power	7½	7½	34/6	..	4 7 0
Llanelly Elec.	5½	6	26/–	..	4 12 4
Lond.Assoc.Electric	4	3	22/–	..	2 14 10
London Electric	6	6	26/6	..	4 10 7
London Power Red. Deb.	5	5	104½	..	4 15 7
Metropolitan E.S.	8	8	40/–	..	4 0 0
Midland Counties	8	8	38/6	+6d.	4 3 1
Mid. Elec. Power	9	9	42/6	..	4 4 9
Newcastle Elec.	7	7	31/–	..	4 10 5
North Eastern Elec.: Ordinary	7	7	32/–	..	4 7 6
7% Pref.	7	7	34/–	..	4 2 4
Northampton	10	10	47/6	..	4 4 0
Notting Hill 6% Pref. (£10)	6	Nil	10	..	—
Northmet Power: Ordinary	7	7	36/6	..	3 16 8
6% Pref.	6	6	30/6	..	3 18 8
Richmond Elec.	6	6	26/–	..	4 12 4
Scottish Power	8	8	37/6	..	4 5 4
Southern Areas	5	5	22/–	–6d.	4 10 11
South London	7	7	26/–	..	5 7 8
West Devon	5	5	23/–	..	4 7 0
West Glos.	4½	3½	23/6	..	2 19 7
Yorkshire Elec.	8	8	39/6	..	4 1 0
Overseas Electricity Companies					
Atlas Elec.	Nil	Nil	5/6	..	—
Calcutta Elec.	7*	6*	38/–	..	3 3 0
Cawnpore Elec.	10	10	32/–	..	6 5 0
East African Power	7	7	32/6	..	4 6 2
Jerusalem Elec.	7	5	28/6	..	3 10 2
Kalgoorlie (10/–)	5	5	9/–	..	5 11 1
Madras Elec.	6*	4*	24/6	..	—
Montreal Power	1½	1½	28½	..	5 5 5
Palestine Elec."A"	4*	5*	43/6	..	2 6 0
Perak Hydro-elec.	6	7	9/6	..	—
Shawinigan Power	83cts.	90cts.	20	..	—
Tokyo Elec. 6%	6	6	20	..	—
VictoriaFallsPower	15	15	4½	..	3 12 9
WhitehallInv.Pref.	—	—	25/–	..	4 16 1

Company	Dividend Previous	Dividend Last	Middle Price July 20	Rise or Fall	Yield p.c. £ s. d.
Public Boards					
Central Electricity: 1955–60 (Civil Defence)	—	3	100	..	3 0 0
1955–75	5	5	115	..	4 7 0
1951–73	4½	4½	107	..	4 4 1
1963–93	3½	3½	103½	..	3 7 8
1974–94	3½	3½	100	..	3 5 0
London Elec. Trans. Ltd.	2½	2½	96½	..	2 11 10
London & Home Counties 1955–75	4½	4½	110	..	4 1 10
Lond.Pass.Trans.: A	4½	4½	117½	+1	3 16 7
B	5	5	115½	..	4 6 7
C	2½	3	62½	..	4 16 0
WestMidlandsJ.E.A. 1948–68	5	5	110	..	4 11 0
Telegraph and Telephone					
Anglo-Am. Tel.: Pref.	6	6	114½	+1	5 3 10
Def.	1½	1½	28	..	5 7 2
Anglo-Portuguese	8	8	24/6	..	6 10 8
Cable & Wireless: 5½ Pref.	5½	5½	114½	+½	4 16 0
Ord.	4	4	78	+1	5 2 8
CanadianMarconi	$1 Nil	4cts.	10/6	..	—
Globe Tel. & Tel.: Ord.	8½*	5*	34/–	..	2 18 10
Pref.	6	6	28/9	..	4 3 6
Great Northern Tel. (£10)	Nil	Nil	24	..	—
Inter. Tel. & Tel.	Nil	Nil	17	..	—
Marconi-Marine	7½	7½	32/6	..	4 12 4
Oriental Tel. Ord.	16	10	42/3	..	—
Telephone Props.	6	Nil	14/6	+3d.	—
Tele.Rentals (5/–)	10	10	11/–	..	4 11 0
Traction and Transport					
Anglo-Arg.Trans.: First Pref. (£5)	Nil	Nil	4/6	..	—
4% Inc.	Nil	Nil	10	..	—
Brit.Elec.Traction: Def. Ord.	45	45	1075	..	4 3 9
Pref. Ord.	8	8	170	..	4 14 2
Bristol Trams	10	10	50/–	..	4 0 0
Brazil Traction	$½	$1	30⅜	+¼	—
Calcutta Trams.	8	5½	40/–	–2/3	2 15 0
Cape Elec. Trams	5	6	25/6	..	4 14 0
Lancs. Transport	10	10	44/3	..	4 10 4
Mexican Light: 1st Bonds	5	5	107½	..	4 13 0
Rio 5% Bonds	5	5	104½	..	4 15 9
Southern Rly.: 5% Prefd.	5	5	76½	..	6 10 7
5% Pref.	5	5	112	+½	4 9 0
T. Tilling	10	10	54/–	..	3 14 0
West Riding	10	10	43/6	..	4 12 0

(*Continued on next page*)

* Dividends are paid free of Income Tax.

Company	Dividend Previous	Dividend Last	Middle Price July 20	Rise or Fall	Yield p.c. £ s. d.
Equipment and Manufacturing					
Aron Elec. Ord...	7½	10	41/3	..	4 17 0
Assoc. Elec.:					
Ord.	10	10	48/6	..	4 2 2
Pref.	8	8	38/–	–1/–	4 4 3
AutomaticTel.&Tel.	12½	12½	56/6	+6d.	4 8 6
Babcock & Wilcox	11	11	47/–	..	4 13 7
British Aluminium	10	10	48/6	..	4 2 6
British Insul. Ord.	20	20	5½	..	3 18 2
British Thermostat (5/–)	18½	18½	17/6	..	5 5 9
British Vac.Cleaner (5/–)	15	30	26/–	..	5 15 5
Brush Ord. (5/–)	6	8	8/–	..	5 0 0
Burco (5/–) ..	15	15	14/3	..	5 5 1
Callender's ..	15	20	95/–	..	4 4 3
ChlorideElec.Storage	15	15	81/3	..	3 14 0
Cole, E. K. (5/–)	7	10	23/–	..	2 3 6
Consolidated Signal	17	24	5⅞	..	4 8 3
Cossor, A. C. (5/–)	15	10*	22/–	..	1 14 1
Crabtree (10/–) ..	17½	17½	38/–	..	4 12 4
Crompton Parkinson Ord. (5/–) ..	20	20	25/–	..	4 0 0
E.M.I. (10/–) ..	6	6	23/6	–3d.	2 11 1
Elec. Construction	10	12½	47/6	..	5 5 3
Enfield Cable Ord.	12½	12½	55/6	..	4 10 1
Elecl. Switchgear (10/–)	10	10	20/–	..	5 0 0
English Electric	10	10	48/–	..	4 3 4
Ensign Lamps (5/–)	25	25	21/3	..	5 17 8
Ericsson Tel. (5/–)	22†	20†	47/6	..	2 2 2
Ever Ready (5/–)	40	40	37/6	..	5 6 8
Falk Stadelmann	7½	7½	31/–	..	4 16 9
Ferranti Pref. ..	7	7	28/9	..	4 17 5
G.E.C.: Pref. ..	6½	6½	32/6	–6d.	4 0 0
,, Ord. ..	17½	17½	88/6	..	3 19 2
Greenwood&Batley	15	15	40/–	..	7 10 0
HallTelephone(10/–)	12½	12½	25/3	..	4 19 0
Henley's (5/–) ..	20	20	24/6	+3d.	4 1 8
4½% Pref. ..	4½	4½	23/–	..	3 18 3
Hopkinsons ..	15	17½	63/9	..	5 9 9
India Rubber Pref.	5½	5½	21/–	..	5 4 9
Intl. Combustion	30	30	6½	..	4 17 10
Johnson & Phillips	15	15	69/–	..	4 7 2
Lancashire Dynamo	20	22½	92/9	+1/6	4 17 0
Laurence, Scott (5/–)	15	12½	12/–	..	5 4 2
London Elec. Wire	7½	7½	31/6	..	4 15 3
Mather & Platt ..	10	10	48/9	..	4 2 0
Met.Elec.CablePref.	5½	5½	21/3	..	5 3 6
Murex	20	20	5	..	4 0 0
Pye Deferred (5/–)	25	25	22/6	..	5 11 1
Revo (10/–) ..	17½	17½	37/–	..	4 14 7
Reyrolle.. ..	12½	12½	67/6	..	3 14 0
Siemens Ord. ..	7½	7½	30/3	..	4 19 2
Strand Elec. (5/–)	4	7½	7/3	..	5 3 5
Switchgear & Cowans (5/–) ..	10	20	15/6	..	6 9 0
T.C.C. (10/–) ..	5	5	18/9	..	2 13 4
T.C. & M. ..	10	10	51/9	–3d.	3 17 1
TelephoneMfg.(5/–)	9	9	12/–	..	3 15 0
Thorn Elec. (5/–)	20	20	21/6	..	4 13 1
Tube Investments	20	20	91/–	..	4 8 1
Vactric (5/–) ..	Nil	Nil	15/–	+1/6	—
Vickers (10/–) ..	10	10	18/6	..	5 8 1
WalsallConduits(4/–)	55	55	43/6	..	5 1 2
Ward & Goldstone (5/–)	20	20	23/9	..	4 4 2
WestinghouseBrake	10	12½	62/6	..	4 0 0
West, Allen (5/–)	7½	7½	7/6	..	5 0 0

* 5 per cent. tax-free.

† Dividends free of Income Tax.

Stocks and Shares (*Continued from page* 123)

it is certainly exasperating—for investment to study such lists as those which follow: instructive, as showing the effect of a money market tightly controlled by Government; exasperating, as illustrative of the difficulty experienced in obtaining a "living" yield from ordinary shares in sound industrials. The all-round, and in many cases substantial, rises that occurred in such prices during 1942 have made further progress this year. Here are representative examples :—

Ordinary shares	*Dec. 31, 1942* s.	d.	*Now* s.	d.	*Rise or Fall* s.	d.
Assoc. Elec. Ind.	48	0	48	6	+	6
British Aluminium	49	0	48	0	— 1	0
British Insulated	100	0	102	6	+ 2	6
Callender's	75	6	95	0	+19	6
Crompton Parkinson (5s.)	24	0	25	0	+ 1	0
English Electric	45	0	48	0	+ 3	0
Ever Ready (5s.)	35	6	37	6	+ 2	0
General Electric	86	0	88	6	+ 2	6
Henley's (5s.)	23	6	24	6	+ 1	0
Johnson & Phillips	63	0	69	0	+ 6	0

To these companies a further dozen prices of ordinary shares may be usefully added, to emphasise the general tendency of the market in such shares during this year :—

Ordinary shares	*Dec. 31, 1942* s.	d.	*Now* s.	d.	*Rise or Fall* s.	d.
Automatic Tel. & Elec.	53	0	56	6	+ 3	6
Crabtree (10s.)	36	0	38	0	+ 2	0
Elec. & Musical Ind. (10s.)	19	9	23	6	+ 3	9
Elec. Construction	39	0	47	6	+ 8	6
Enfield Cable Ord.	58	6	55	6	— 3	0
Ericsson Tel. (5s.)	43	9	47	6	+ 3	9
Lancs. Dynamo	76	6	92	9	+16	3
Mather & Platt	46	3	48	9	+ 2	6
Reyrolle	62	0	67	6	+ 5	6
Siemens	28	0	30	3	+ 2	3
TelegraphConstruction	46	0	51	9	+ 5	9
Westinghouse Brake	57	6	62	6	+ 5	0

This review of price movements in the year to date would be incomplete without a reference to the activity of shares in the radio companies. Mild excitement sprang up in Electric & Musical, A. C. Cossor, E. K. Cole, Pye deferred and certain others engaged in this branch of industry, and although public interest subsided after a time, the share prices, it was noticed, held their ground at the advanced levels. Within the past few weeks, rubber shares have risen rapidly.

NEW PATENTS

Electrical Specifications Recently Published

The numbers under which the specifications will be printed and abridged are given in parentheses. Copies of any specification (1s. each) may be obtained from the Patent Office, 25, Southampton Buildings, London, W.C.2.

BRITISH Insulated Cables, Ltd., J. Conning and T. Cain.—"Joints for electric conductors." 2821. March 3rd, 1942. (554351.)

British Thomson-Houston Co., Ltd.—"Liquid-gas separating apparatus." 914/42. January 24th, 1941. (554314.) "Quartz or glass to metal seals." 10464/42. July 29th, 1941. (554330.) "Resinous condensation products." 14451/41. November 12th, 1940. (554339.) "Tuning indication systems in radio receivers." 1679/42. February 12th, 1941. (554388.) "Panels for electric switchboards and the like." 12630/42. September 12th, 1941. (554459.)

British Thomson-Houston Co., Ltd. (General Electric Co.).— "Dynamometer excitation control systems." 2269. February 20th, 1942. (554349.)

British Thomson-Houston Co., Ltd., and A. V. A. Abraham.—"Apparatus for heat-treating lengths of glass tubing." 1960. February 13th, 1942. (554347.)

British Thomson-Houston Co., Ltd., and J. G. Wellings.—"Cores for electric transformers and chokes." 658. January 16th, 1942. (554384.)

A. H. Cooper.—"Electrical indicating or control systems." 30406. November 20th, 1939. (554405.)

Davenport Engineering Co., Ltd., and F. E. Gill.—"Cooling towers." 2792. March 3rd, 1942. (554392.)

E. Dunlop.—"Windchargers or windmills." 9113. July 1st, 1942. (554431.)

Electrolux, Ltd.—"Manufacture of refrigerating apparatus." 1930/42. February 13th, 1941. (554389.)

English Electric Co., Ltd., and K. C. Bairstow.—"Gauging devices." 2894. March 5th, 1942. (554393.)

Entreprises Electriques Fribourgeoises, and E. Challet.—"Electric boiling apparatus." 11235/41. September 12th, 1940. (554304.)

A. P. Hill, and Automatic Telegraph & Radio Transceiver Co., Ltd.—"Inking mechanism of electrical recording apparatus." 16505. December 22nd, 1941. (554308.)

Holophane, Ltd. (Holophane Co., Inc.).—"Luminairs." 12936. September 14th, 1942. (554369.)

H. C. Mallett and A. Ferrari.—"Multi-contact controllers or switches." 16744. December 29th, 1941. (554381.)

Marconi's Wireless Telegraph Co., Ltd.—"Concentric line inductances." 2765/42. March 1st, 1941. (554350.)

Mavor & Coulson, Ltd. and J. O. Mavor.—"Apparatus for loading material underground in mines." Cognate applications 1048/42, 1451/42 and 8354/42. January 26th, 1942. (554451.)

A. S. Milinowski, jun.—"Short wave diathermy apparatus." 4149. March 28th, 1942. (554319.)

Philips Lamps, Ltd. (Naamlooze Vennootschap Philips' Gloeilampenfabrieken).—"Noise reducing arrangements for discharge tube amplifiers." 7199. June 6th, 1941. (554371.) "Tuning dials for radio receivers." 3859. March 23rd, 1942. (554455.)

Plessey Co., Ltd.—"Insulated wire units and method of making same." 4857/42. July 10th, 1941. (554400.)

P. A. Sporing and Telegraph Condenser Co., Ltd.—"Electrical condensers." 5595. April 27th, 1942. (554361.)

Standard Telephones & Cables, Ltd.—"Impedance matching networks for use in electrical transmission systems." 9967/42. July 25th, 1941. (554329.) "Inductance apparatus." 8435/42. June 28th, 1941. (554367.) "Regulation of repeater gain." 5883/42. February 5th, 1941. (554426.)

Standard Telephones & Cables, Ltd. (International Standard Electric Corporation).—"Electrical communication systems." 5449. April 23rd, 1942. (554456.)

S. D. Sullam.—"Electric torch cases for use on cycles and similar vehicles." 3797. March 23rd, 1942. (554395.)

Switchgear & Cowans, Ltd., and A. Upton.—"Metalclad switchgear having earthing arrangements." 3527. March 17th, 1942. (554452.)

Telephone Manufacturing Co., Ltd., S. J. Smith and R. S. G. Terry.—"Clock mechanisms." 873. January 21st, 1942. (554450.)

United Aircraft Corporation.—"Insulating and sealing member for the connection between a spark-plug and an ignition cable." 15928/41. January 29th, 1941. (554342.)

Westinghouse Brake & Signal Co., Ltd., S. A. Stevens and T. F. E. Watson.—"Speed control systems for direct current electric motors." 16727. December 29th, 1941. (554411.)

Westinghouse Electric International Co.—"Electric discharge devices and a method of manufacture thereof." 5782/42. April 30th, 1941. (554424.)

Blind Engineering Workers

EVERYBODY knows that hundreds of blind persons have been trained by St. Dunstan's to earn their own living but it is not generally known how many are employed in engineering works. An idea of the wide range of jobs to which blind people have adapted themselves successfully is given in the June-July "Production and Engineering Bulletin" of the Ministries of Production and Labour. Blind workers in industry often show unusual powers of concentration on the job; workshop incidents which distract the sighted worker do not interfere with the blind person. Moreover, his handicap is often accompanied by supersensitivity of touch and hearing which is a valuable asset. In the electrical sphere blind persons are employed in the following occupations:—Electrician's mate; sleeving copper wire with silk plaited tubing; taping armatures; transformer core building; and radio wiring.

CONTRACT INFORMATION

Accepted Tenders and Prospective Electrical Work

Contracts Open

Where "Contracts Open" are advertised in our "Official Notices" section the date of the issue is given in parentheses.

Australia. — NEW SOUTH WALES. — October 27th. Sydney County Council. Steam generating plant, Pyrmont power station (Section B); Specification 650. 50,000-kW steam turbo-alternator; Specification 651.

West Midlands.—August 10th. Joint Electricity Authority. 33-kV interconnecting cable. (See this issue.)

Orders Placed

Australia.—COMMONWEALTH.—Department of Supply and Shipping. Accepted. Cable, Con. 1198.—W. T. Henley's Telegraph Works Co., Ltd. (£480); Noyes Bros. (Sydney), Ltd. (£621); Australian General Electric Pty., Ltd. (£422); Siemens (Aust.) Pty., Ltd. (£255); Enfield Cable Works Pty., Ltd. (£424).

P.M.G.'s Department. Accepted. Start-stop telegraph machines, Sch. C.3897 (£13,105 plus exchange).—Standard Telephones & Cables Pty., Ltd. Plugs, Sch. C.3894.—Ericsson Telephone Mfg. Co. (£2,408 plus exchange); Standard Telephones (£2,430).—*Tenders.*

Barrow - in - Furness. — Electricity Committee. Accepted. 500-kVA transformer (£368).—British Electric Transformer Co.

London. — CAMBERWELL. — Public Service Committee. Recommended. Electric furnace at the crematorium (£4,026).—Birmingham Electric Furnaces.

Newcastle-on-Tyne.—City Council. Accepted. Electric lamps:—A. S. McHugh & Co. (£800); United Electric Co. (£606); Ensign Lamps, Ltd. (£850); Philips Lamps (£547); and Siemens Electric Lamps & Supplies (£248).

Electrifying hand lift, City Road cooking depot (£132).—Austin Lifts.

Stockport.—Electricity Committee. Accepted. Ring main unit for electricity works (£338).—Ferguson, Pailin.

Sunderland. — Corporation. Accepted. Electrical induction apparatus for the Cherry Knowle Hospital (£122).—Marconi Instruments, Ltd.

Contracts in Prospect

Particulars of new works and building schemes for the use of electrical installation contractors and traders. Publication in this section is no guarantee that electrical work is definitely included. Alleged inaccuracies should be reported to the Editors.

Aethwey (Anglesey).—Farm workers' houses at Llansadwrn and Llanedwen for R.D.C.; Henry Jones & Sons, builders, Beach Road, Rhosneigr, Anglesey.

Altrincham.—Store, garage, etc., Denmark Street; Yarwood's Ltd., contractors, Moss Lane Bridge.

Mechanics' workshop; F. W. Robinson, 12, Green Walk.

Ayrshire.—Houses, North and South Ayrshire areas; county architect, Ayr.

Bakewell.—Water supply scheme for Derbyshire War Agriculture Committee; Major A. H. S. Waters, consulting engineer, 25, Temple Row, Birmingham, 2.

Basford.—Farm workers' houses, Woodborough, Barton-in-Fabis and East Leake, for R.D.C.; E. Anderton, clerk, Rock House, Stockhill Lane, Basford, Nottingham.

Bishop Auckland.—Extensions to button factory; E. M. Lawson, architect, Barras Buildings, Barras Bridge, Newcastle-on-Tyne.

Pre-fabricated British Restaurant; surveyor, U.D.C. offices.

Brancepeth (Co. Durham).—Miners' canteen; E. Jeffcock, Walbottle Road, Newburn-on-Tyne.

Buckingham.—Farm workers' houses (10) at Chackmore, Twyford and Padbury for R.D.C.; Pollard & Son, builders, School Lane, Buckingham.

Deaf Hill. (Durham).—Miners' canteen; G. Lazenby & Sons, Ferryhill.

Essex. — Clinic, Walthamstow (£2,000); county architect, Chelmsford.

Cumberland.—Farm workers' houses (22) in the Wigton area for the North-Eastern Housing Association; Thomas Armstrong and Sons, Ltd., builders, Cockermouth.

Daventry.—Catholic Church, Long Buckley; Rev. Fr. H. G. Farmar, P.P. Catholic Church, Daventry.

Derbyshire.—Youth centre, Stanton Road, Ilkeston; J. Harrison, county architect.

Felling - on - Tyne.—School dining centres; education architect.

Gateshead.—Wartime nurseries; borough surveyor.

Hay and Painscastle.—Agricultural houses (10), Talgarth, Glasbury, Llanigon and Llowes, for R.D.C.; Herbert Skyrme, architect, 138, Widemarsh Street, Hereford.

Hertfordshire.—Additions at Peartree School, Welwyn Garden City (£2,000); Clerk's Department, Castle Street, Hertford.

Jarrow.—Three kitchens for school meals; borough engineer.

Llandilo. — Houses (£7,082) for R.D.C.; Morris & Sons, builders, Penybank, Llandilo.

London. — CATFORD. — Additions, L.P.T.B. substation; S. A. Heaps.

Additions, Bromley Road for Robertsons, Ltd.; Troup & Steele.

Manchester.—Works canteen, Ladybarn Lane; R. Buck, Ltd., haulage contractors, 11, Ladybarn Road, Fallowfield.

Works canteen extensions, Newton Heath; G. G. Barnes, architect, 12, Guildhall Street, Preston.

Reinstatement of works after fire, Trentham Street, Hulme; Smith & Allcock, Ltd., builders, 471, Chester Road.

Middlesbrough.—Control room, Westbourne Grove, for the N.F.S.; divisional officer.

Newbury. — British Restaurant (£2,466); borough surveyor, Municipal Offices.

Newcastle-on-Tyne.—Additional temporary accommodation at Blakelaw School (£6,000); Anglo-Scottish Construction Co., Ltd., builders, Newcastle-on-Tyne.

Alterations and additions to the Diana Street Maternity and Child Welfare Centre; architect: J. O. C. Solomon, city property surveyor, Town Hall.

Newport (Isle of Wight).—Restaurant, St. James Street; borough engineer.

Offices and stores, Terrace Road for W. H. Morey & Sons, Ltd.; F. Chiverton, architect.

Pendleton.—Building, South Radford Street, Lower Kersal; R. A. Brand & Co., Ltd., paper manufacturers, Bridge Paper Mills.

Rhyl.—Central residential youth club, Glanmorfa; secretary, Welsh National Council, Y.M.C.A. Buildings, Cardiff.

Romford. — Additions, Oldchurch hospital (£4,531); Pitchers, Ltd.

Ross and Whitchurch.—Farm workers' houses (10) for R.D.C.; Hiles & Son, builders, Putson, Hereford.

Runcorn.—Fire station; N.F.S. divisional officer.

Ryhope.—Colliery buildings; E. Jeffcock, Walbottle Road, Newburn-on-Tyne.

Salford.—Office and workshop, Greengate; E. J. Coupe & Sons, Ltd., building contractors, Springfield Lane, Greengate.

Stretford.—Works additions; W. H. Smith & Co. (Whitchurch), Ltd., Talbot Street, Whitchurch, Salop.

Sutton Bridge.—British Restaurant for East Elloe R.D.C.; surveyor, West End, Holbeach.

Swinton and Pendlebury.—Extensions, Electric House; Thorpe & Smith, architects, 66, Deansgate, Manchester, 3.

Wingate.—Miners' canteen; Tate & Holmes, Benwell Village, Newcastle-on-Tyne.

Beating the "Sneak Raider"

TO meet the menace of the "sneak raider" an air-raid warning system supplementary to the normal siren alert has been developed by the local authorities at Hove. Impulses transmitted on a special P.O. danger signal network are amplified and passed on to loudspeakers situated in various parts of the town thus giving local warning of imminent danger. Some idea of the speed of operation may be gauged from the fact that there is a time lag of only half a second between the receipt of the control impulse and the broadcast of the warning signal from the loudspeakers.

Spotter's post for raid warning system

The equipment consists of a signal generator, control and switchgear mounted in panel form on a 6-ft. rack frame and bolted to this is a similar rack carrying an 800-W amplifier. The main amplifier performs three principal functions automatically, and in order of priority: (*a*) The broadcast of an "imminent danger" warning signal and the corresponding "imminent danger" release; (*b*) the normal Home Office "alert" and "all clear" siren tones; (*c*) police announcements by microphone.

The "imminent danger" warning signal is a series of short piercing "beeps" at the rate of forty-eight per minute for thirty seconds while the i.d. release is a continuous note of a similar pitch for a like period. The normal siren "alert" and "all clear" signals are simulated electronically and are broadcast throughout the speaker network simultaneously with the sirens. The police announcements are made through a moving coil microphone installed in the amplifier room. The entire system is normally operated from a remote control centre by means of impulses transmitted to a tuned relay and thence to the signal control equipment.

In addition to the check meters, a neon indicator and monitor speaker previously mentioned, other aids to quick location of faults and servicing are embodied in the design and although protective covers are provided at the rear of each panel they can be quickly and easily removed, in this way leaving the whole of the components and wiring readily accessible.

The equipment, which has already on more than one occasion been instrumental in preventing many serious casualties, was supplied and installed by Broadcast Amplifiers, Ltd., in co-operation with the makers, the General Electric Co., Ltd.